Bootsole Project

Biological Evaluation

Plumas National Forest
Beckwourth Ranger District

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Introduction

The United States Department of Agriculture (USDA) Forest Service, Plumas National Forest (PNF), Beckwourth Ranger District (BKRD), proposes to implement the Bootsole Project, a three-pronged project addressing:

1. Timber stand improvement for forest health and resiliency
2. Meadow system health for wildlife habitat improvement
3. Water quality by reducing transportation system effects on watershed resources.

Detailed descriptions of the Bootsole Project proposed action can be found in the Bootsole Project Decision Memo. All activities proposed may potentially occur in 2021.

The purpose of this Biological Evaluation (BE) is to review and document how the proposed Bootsole Project may affect Region 5 Forest Service Sensitive species and their habitats, and is prepared in accordance with standards established in Forest Service Manual direction (FSM 2672.4).

Species federally listed under the Endangered Species Act are considered in a separate Biological Assessment for the Bootsole Project. An Official Species List of Federally Threatened and Endangered Species that may be affected by the Bootsole Project was provided by the US Fish and Wildlife Service on January 4, 2021 (accessed via https://ecos.fws.gov/ipac/). Table 1 contains a list of Threatened, Endangered, Proposed, Candidate and Sensitive (TES) species that potentially occur on the PNF.

Table 1. Region 5 Forest Service sensitive animal species that potentially occur on Plumas National Forest

Threatened, Endangered and Sensitive Species (Scientific Name)	Species Status*	Habitat or Ecosystem Component	Category for Project Analysis**
Invertebrates			
Western bumble bee (*Bombus occidentalis*)	USFS : S	Access to Flowering Plants and Abandoned Rodent Burrows	3
Fish			
Hardhead minnow (*Mylopharodon conocephalus*)	USFS : S, DFW : SSC	Riverine and Lacustrine	1
Amphibians			
Foothill yellow-legged frog (*Rana boylii*)	USFS : S, DFW : SSC	Riverine and Lacustrine	3
California red-legged frog (*Rana aurora draytonii*)	FT	Riverine and Lacustrine	1
Reptiles			
Western pond turtle (*Actinemys marmorata*)	USFS : S, DFW : SSC	Riverine and Lacustrine	1
Birds			
Bald eagle (*Haliaeetus leucocephalus*)	USFS : S, SE, USFWS : BCC	Large trees adjacent to riverine and lacustrine	1
California spotted owl (*Strix occidentalis occidentalis*)	USFS : S,MIS, DFW : SSC, USFWS : BCC	Late Seral Closed Canopy Coniferous Forest	3
Greater sandhill crane (*Grus canadensis tabida*)	USFS : S, ST	Open habitats (grasslands and croplands), shallow lakes, fresh emergent wetlands	3
Great gray owl (*Strix nebulosa*)	USFS : S, SE	Late Seral Closed Canopy Coniferous Forest adjacent to wet meadows	2
Northern goshawk (*Accipiter gentilis*)	USFS : S, DFW : SSC	Late Seral Closed Canopy Coniferous Forest	3

Threatened, Endangered and Sensitive Species (Scientific Name)	Species Status*	Habitat or Ecosystem Component	Category for Project Analysis**
Willow flycatcher (*Empidonax trailii brewsteri*)	USFS : S,SE, USFWS : BCC	Riparian with Dense Willows	2
Yellow-billed Cuckoo (*Coccyzus americanus*)	FT	Large patches of riparian vegetation along low gradient open river valleys	1
Mammals			
Sierra marten (*Martes caurina sierrae*)	USFS : S	Late Seral Closed Canopy Coniferous Forest	3
California wolverine (*Gulo gulo luteus*)	FP, USFS : S, ST	Late Seral Closed Canopy Coniferous Forest	2
Pallid bat (*Antrozous pallidus*)	USFS : S, DFW : SSC	Open, Dry Habitats with Rocky Area	3
Townsend's big-eared bat (*Corynorhinus townsendii*)	USFS : S, DFW : SSC	Mesic Habitats	3
Fringed myotis (*Myotis thysanodes*)	USFS : S	Hardwood-conifer Open Canopy Forest	3
Gray Wolf (*Canis lupus*)	USFS : S; SE	Generalist	3

***Species Status: USFS: S** = U.S. Forest Service - Sensitive, **USFS: MIS** = U.S. Forest Service – Management Indicator Species, **SE** = State Endangered, **ST** = State Threatened, **DFW: FP** = State Fully Protected, **DFW: SSC** = State Species of Special Concern, **USFWS: BCC** = U. S. Fish and Wildlife Service Birds of Conservation Concern, **SOI** = Species of Interest.

** **Category 1:** Species whose habitat is not in or adjacent to the aquatic or terrestrial wildlife analysis areas and would not be affected by the project. **Category 2:** Species whose habitat is in or adjacent to the aquatic or terrestrial wildlife analysis areas, but would not be either directly or indirectly affected by the project. **Category 3:** Species whose habitat would be either directly or indirectly affected by the project.

The hardhead minnow (*Mylopharodon conocephalus*), California red-legged frog (*Rana aurora draytonii),* western pond turtle (*Emys marmorata*), and Yellow-billed Cuckoo (*Coccyzus americanus*), identified as Category 1 above, will not be further discussed because the project area is either outside the range or suitable habitat does not exist in the project area for these species. Therefore, the project will not directly or indirectly affect these species or their habitat.

Category 2 species, with habitat in or adjacent to the analysis area that would not be either directly or indirectly affected by the project include great gray owl, willow flycatcher, and California wolverine. Although great gray owls have been reported on the Forest, there have been no confirmed observations in the last 10 years, despite intensive survey effort. Although apparently suitable habitat for GGOW occurs on the Forest, owls are sporadic visitors at best and not known from the adjacent landscape. There are no records of great gray owl observations in the analysis area. There are no records of willow flycatcher observations in the project area. No willows or other suitable habitat will be modified during project activities. If willow flycatcher are found in the project area prior to implementation, a seasonal LOP would be applied to protect breeding willow flycatchers. The nearest wolverine sighting is 2.5 miles south of the project area. Proposed treatments are not expected to affect the suitability of habitat for wolverine, as they are somewhat generalist and use a variety of conditions. If wolverine are detected prior to or during implementation, activities that have potential to impact the species will be evaluated at that time. Category 2 species will not be further addressed in this BE.

Species with habitat that would be either directly or indirectly affected by the Bootsole Project (Category 3, Table 1) are carried forward in the BE. The BE report will evaluate the direct, indirect, and cumulative effects of the proposed action on these species and their habitats.

Analysis Framework: Relevant Laws, Regulation, and Policy

The Forest Service must adhere to the following laws, regulations, and policies when planning and implementing projects affecting Forest Service Lands:

Federal Law

- Bald and Golden Eagle Act of 1940, as amended
- Endangered Species Act (ESA 1973)
- National Environmental Policy Act (NEPA 1969)
- National Forest Management Act (NFMA 1976)
- The Migratory Bird Treaty Act of 1918, as amended

Executive Orders

- Invasive Species, EO 13112 of February 3, 1999
- Migratory Birds, EO 12962 of January 10, 2001
- Environmental Justice, EO 12898 of February 11, 1994

Regulation

- Code of Federal Regulations (23, 36, 50 CFR)
- Departmental Regulation 9500-4
- Plumas National Forest Land and Resource Management Plan (PNF LRMP)
- Sierra Nevada Forest Plan Amendment (SNFPA) and its Final Supplemental Environmental Impact Statement (FSEIS), Record of Decision (ROD), January 2001
- Sierra Nevada Forest Plan Amendment (SNFPA) and its Final Supplemental Environmental Impact Statement (FSEIS), Record of Decision (ROD), January 2004

Policy

- Forest Service Manual and Handbooks (FSM/H 1200, 1500, 1700, 2600)
- Regional Forester (Region 5) Sensitive Plant and Animal Species List (June 10, 1998), as appended October 15, 2007; updated July 3, 2013.
- USDA Forest Service Best Management Practices (USDA 2012)
- USFWS Species List (September 3, 2019)

Forest Service Manual policy for Forest Service Sensitive Species (2670.32) states that the USFS shall, among other things:

- *Review programs and activities as part of the National Environmental Policy Act of 1969 process through a biological evaluation, to determine their potential effect on sensitive species.*
- *Avoid or minimize impacts to species whose viability has been identified as a concern.*
- *Analyze, if impacts cannot be avoided, the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole. (The line*

officer, with project approval authority, makes the decision to allow or disallow impact, but the decision must not result in loss of species viability or create significant trends toward federal listing.)

The proposed activities and objectives are consistent with Federal laws and regulations in a manner that maintains or improves project area resource conditions and achieves the objectives and desired conditions described in the Plumas National Forest Land and Resource Management Plan (PNF LRMP; USDA 1988), as amended by the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (SNFPA FSEIS) and Record of Decision (ROD) (USDA 2004).

Forest Service direction for Threatened, Endangered, and Sensitive (TES) species incorporated in the BE can be found in the Forest Service Manual (FSM 2672.4). The Plumas National Forest Land and Resource Management Plan (LRMP), as amended by SNFPA FSEIS ROD provides standards and guidelines for how TES species will be managed. Appendix A of this Biological Evaluation provides a list of standards and guidelines, that are a subset of all applicable Land and Resource Management Plan direction, and this project is being analyzed for consistency to all applicable Forest Plan standards and guidelines for terrestrial and aquatic wildlife, including Aquatic Management Strategy (AMS) Goals and Riparian Conservation Objectives (RCOs, USDA 2004).

Information regarding threatened, endangered, proposed, candidate and sensitive animals is also obtained through the cooperation of the US Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW).

State and Local Law

- California Endangered Species Act (CESA 1970)
    - Plumas National Forest Land and Resource Management Plan (PNF LRMP) page 4-33: *Maintain viability of State-listed species. In cooperation with the DFG, conduct surveys for State-listed species. At a minimum, provide habitat sufficient to maintain existing populations.*

California Department of Fish and Wildlife

Input specific to the Bootsole Project was not solicited from the California Department of Fish and Wildlife through the public scoping process. However, all past advice from the Department was considered during the planning of the Bootsole Project.

Analysis Methodology

Geographic Analysis Areas

The **project area** is located at elevations ranging from approximately 5,800 to 6,800 feet. The **treatment area** is defined as the units to be treated, 4,233 acres, within the project area boundary. For the purpose of this BE, the **Wildlife Analysis Area** (WAA; Figure 2) is the same for terrestrial and aquatic wildlife, and is defined as the project area plus an additional larger land base that allows habitat changes predicted as a result of project activities to be viewed on a broader, more realistic scale of other available habitat, while not being so large as to mask the effects of project activities. The Wildlife Analysis Area is approximately 14,508 acres and was delineated as a one-mile buffer of the Project Area.

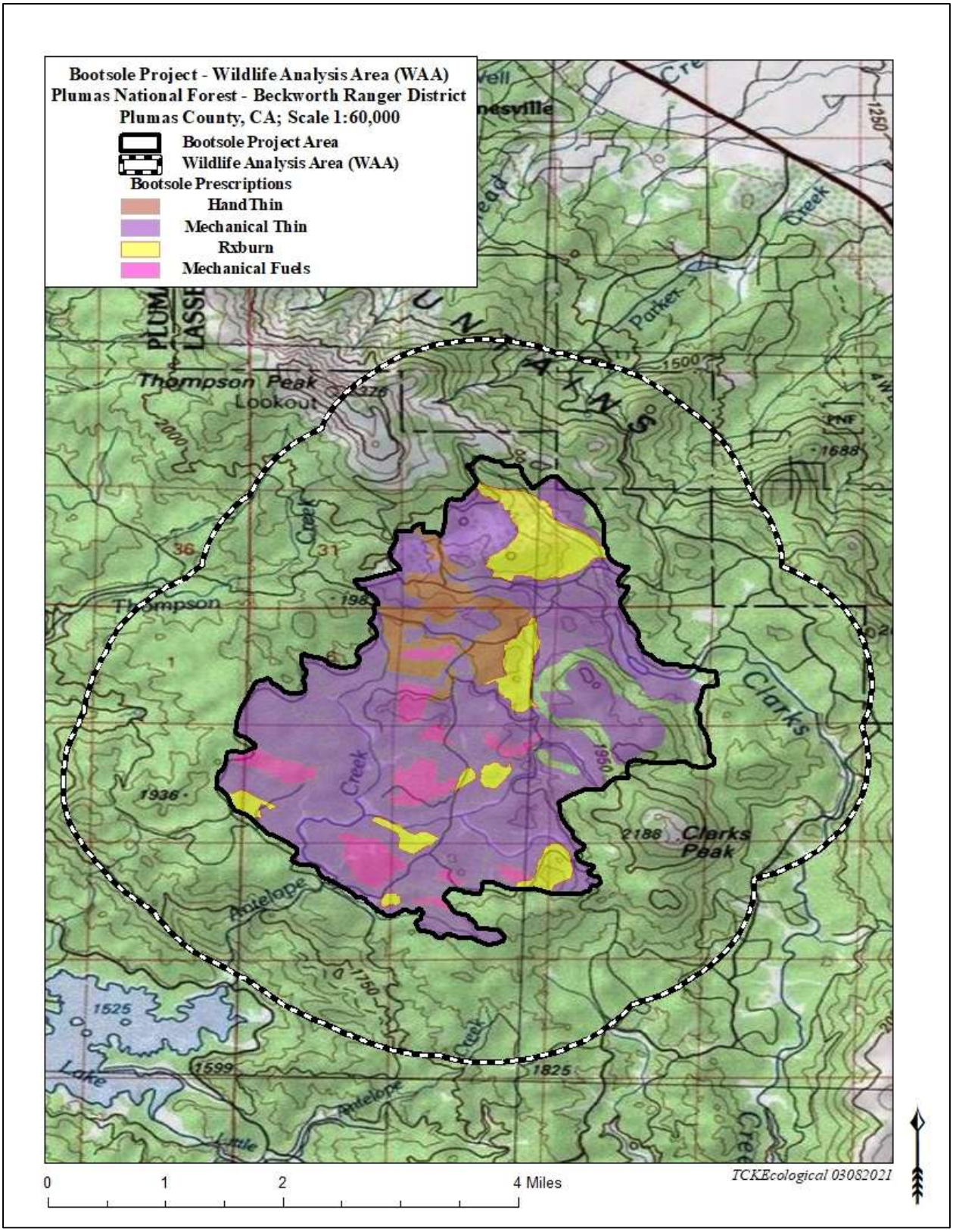

Figure 1: Bootsole project area and Wildlife Analysis Area (WAA)

Specific Methodology

It is assumed in this analysis that the Proposed Action would be implemented as stated, in compliance with all rules and regulations governing land management activities, including the use of the appropriate Limited Operating Periods (LOPs) identified in Table 13.

The Bootsole Project was reviewed on the ground, as well as using satellite imagery (NAIP), vegetation layer spatial datasets, species specific spatial datasets and known information to help determine suitable habitat for species. The California Wildlife Habitat Relationships (CWHR) vegetation classification system was used as the baseline acres for analyses (Appendix C of USDA 2004). Forest-wide vegetation typing is updated after fires and forest activities to most accurately represent available habitat types. For the analysis of effects, changes to suitable habitat and impacts to management units (i.e., protected activity centers, PACs; nesting territories, etc.) were determined using a spatial dataset of the vegetation layer combined with type of treatments (e.g. mechanical thinning, hand thinning, prescribed fire). In the field, areas identified as suitable habitat in the analysis area were surveyed according to applicable Region 5 approved protocols:

- "Standardized Protocol for Surveying Aquatic Amphibians" (Fellers and Freel 1995)
- "Protocol for Surveying for Spotted Owls in Proposed Management Activity Areas and Habitat Conservation Areas March 12, 1991 (Revised February 1993)" (USDA 1993)
- "Survey Methodology for Northern Goshawks in the Pacific Southwest Region, U.S. Forest Service" (USDA 2000)
- "American Marten, Fisher, Lynx and Wolverine: Survey Methods for Their Detection" (Zielinski and Kucera 1995)

Data Sources

- GIS layers of the following information on Plumas National Forests: vegetation layer (Wildlife Analysis Area – 1-mile buffer), ownership, aquatic features (streams, springs and lakes, etc.), and species management layers (e.g. PACs, HRCAs), species observations.
- Stand exam data (Bootsole Project Area)
- US Forest Service Region 5 GIS NHD stream layer
- Survey reports, incidental detections, field verification of potential suitable habitat
- Scientific literature

Terrestrial and Aquatic Wildlife Indicators

- Acres of suitable habitat modified, lost or fragmented at various scales.
- Habitat components modified, lost or fragmented.
- Changes in vegetation and meadow characteristics.
- Changes in road density.

Timeframe

- Short-term timeframe: 1 year
- Long-term timeframe: 25-30 years, because climate change, unforeseeable future projects, demographic changes, etc. makes assumptions beyond this timeframe speculative.

Cumulative Effects Analysis

Long-term timeframe: 25-30 years because climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this timeframe speculative.
Spatial Boundary: Wildlife Analysis Area
Methodology: In order to understand the contribution of past actions to the cumulative effects of the proposed action, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects.

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one cannot reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, “agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.”

Present and future projects planned that overlap with the Wildlife Analysis Area may have cumulative impacts to wildlife, fisheries and amphibians. In this analysis, each present and future project is analyzed by species in order to understand the contribution of present and future projects to the cumulative effects of the proposed action. See Appendix A for a list of all the current, future, and ongoing activities that were considered in each of the environment and species analyses.

Existing Conditions

The project area is located on top of the escarpment above the community of Janesville, CA; approximately 1.5 miles south of Thompson Peak, 3 miles south of Janesville, and 4 miles west of route 395. It includes all or portions of: Township (T) 28 North (N), Range (R) 13 East (E), Sections 31 through 33; T27N, R12E, Sections 1 and 12; and T27N, R13E, Sections 4 through 10 and 16 through 18 of the Mount Diablo Meridian (see Figure 1). The project area is within all or portions of Antelope Creek, Clarks Creek, McDermott Creek, and Boulder Creek Hydrologic Unit Code 6 watersheds. The project area encompasses 4,433 acres of National Forest System lands located within the Last Chance Management Area (MA 40), as identified in the 1988 Plumas National Forest Land and Resource Management Plan. The elevation of the project area ranges from 5,800-6,800 feet with average annual precipitation ranging from 20 to 30 inches. Topography consists of flat to gently sloping terrain. Approximately 600 acres of the project area lies within a wildland urban interface zone (WUI), which is an area where human habitation is mixed with areas of flammable wildland vegetation.

Terrestrial Environment

The Bootsole project area is primarily comprised of upland eastside pine stands with meadows and aspen stringers, or narrow, connected aspen groves that follow the riparian corridor. Aspen is located both in upland and lowland meadows and riparian areas. There are infrequent Sierran mixed conifer stands at the highest elevations and northwestern portion of the project area. Dominant conifer vegetation within the project area includes Jeffrey and ponderosa pine with mixtures of white fir, sugar pine and incense cedar at higher elevations, and lodgepole pine in lower, moist areas (See Appendix B).

Eastside pine stands and Sierran mixed conifer stands within the project area are currently overstocked due to fire suppression and past management activities. White fir is encroaching into these stands and is not well adapted to the dry conditions; leaving stands susceptible to insect and disease infestation and high severity stand replacing wildfire. Many stands have experienced elevated levels of tree mortality associated with insects, pathogens and drought and contain high numbers of standing and down dead trees. Jeffrey pine and lodgepole pine is encroaching on the aspen stringers and meadows and has created carpets of advanced regeneration throughout some pine stands.

Fire exclusion and past timber harvests have contributed to a change in the forest habitat, resulting in increased stand densities than would not have existed naturally. The majority of the forested stands within the WAA are dominated by trees in the 12 to 24”-inch DBH range with +40 percent canopy closure (Table 2).

The predominant CWHR size class of forest stands in the Bootsole Project WAA is 4, which accounts for approximately 54 percent. CWHR size class 5 habitat accounts for about 11 percent of the Wildlife Analysis Area. There is no Size Class 5 or 6 within the Bootsole Treatment Area. Appendix B defines the CWHR vegetation types and classes and displays existing acres within the analysis area. Only habitat data for Forest Service Land is used in this analysis of habitat presence since the Forest Service does not have authority over non-Forest Service Land. It is acknowledged that there are some disparities in habitat typing between CWHR and actual stand data and that the acres could be inexact estimates of habitat availability.

Encroachment of shade-tolerant conifers on aspen stands is resulting in decreased size and health of these unique habitats. Aspen trees are experiencing increased competition for light, water, and nutrients which is impacting stand vigor and new growth. Aspen communities are particularly important for supporting diverse wildlife and plant communities and stands with dense conifers are at high risk of losing their ability to sustain diversity. Meadows are similarly being encroached upon by lodgepole pine and white fir, resulting in decreased meadow sizes and leading to the decline of meadow communities on the landscape. Historically, fire kept conifer encroachment of meadows in check. Without this natural process, conifers have been able to become established within the meadows. Encroaching conifers can remove water from the meadow system through growth and transpiration, drying out the meadow and transforming its function to a more upland system which accelerates further conifer and upland shrub encroachment. There are approximately 106 acres of meadow habitat in the Wildlife Analysis Area, mostly smaller in area and less defined due to encroachment of pine and upland shrub species.

A California Spotted Owl Protected Activity Center (CSO PAC) is located in the west-central portion of the project area. With the current fuel loading surrounding and within the PAC, there is a risk of habitat loss due to high-severity stand replacing fire. Several stand replacing wildfires have occurred near and adjacent to the project area in recent years including the Moonlight, Antelope, Diamond, Sheep, and Walker fires. The frequency of fires in the recent past and the high fuel loadings underscore the necessity of thinning stands to protect wildlife habitat in the project area, especially the CSO PAC, from being destroyed by high severity fire.

Furthermore, within the project area there are system roads in need of maintenance as well as multiple non-system roads that are contributing to decreased hydrologic function by changing natural drainage

patterns, compacting soils, and contributing sediment to adjacent waterways. Road densities are high: approximately 5.17 miles of road per square mile in the Project Area and 3.41 miles of road per square mile in the Wildlife Analysis Area. Roads are native surface.

To address these undesirable conditions, a list of proposed actions has been developed that would restore desired conditions and goals in the Bootsole project area as described in the Plumas National Forest Land and Resource Management Plan as amended by the Sierra Nevada Forest Plan Amendment (SNFPA) Final Environmental Impact Statement and Record of Decision (ROD). Opportunities were identified to meet goals related to forest structure and function, fire and fuels management, plant and animal communities, and wildlife habitat.

Table 2. Summary of California Wildlife Habitat Relationships (CWHR) types within the wildlife analysis area (all acres are approximate and only include National Forest lands).

Seral Stage	CWHR Size-Density	Acres of existing condition in analysis area	Acres of existing condition in units
Conifer Forest - Multi-Layered, Dense Canopy	6	0	0
Conifer Forest - Late Seral Dense Canopy	5D	475	0
Conifer Forest - Late Seral Moderate Canopy	5M	840	0
Conifer Forest - Late Seral Open Canopy	5P	313	0
Conifer Forest - Mid Seral, Dense Canopy	4D	952	91
Conifer Forest - Mid Seral, Moderate Canopy	4M	2971	379
Conifer Forest - Mid Seral, Open Canopy	4P	3,160	589
Conifer Forest - Mid Seral, Sparse Canopy	4S	710	0
Conifer Forest - Early Seral, Dense Canopy	3D	1027	930
Conifer Forest - Early Seral, Moderate Canopy	3M	1,149	1,042
Conifer Forest - Early Seral	Size Class 1,2 3P, 3S	1,702	1,096
Hardwood Forest		19	0
Shrub Dominated		636	0
Meadow		345	106
Non-Vegetated		208	0
Total		**14,508**	**4,433**

Conifer forest includes EPN, JPN, and SMC; Hardwood Forest includes MHC; Meadow includes AGS, PGS and WTM; Shrub Dominated includes MCP, MRI; and SGB; Non-Vegetated includes BAR, LAC, and URB.

Size Class: 1 = Seedling Tree <1" dbh; 2 = Sapling Tree 1 - 6" dbh; 3 = Pole Tree 6 - 11" dbh, 4 = Small Tree 11 - 24"dbh; 5 = Medium/Large Tree >24"dbh; 6 = Multi-layered Tree.

Canopy Cover: D = Dense Canopy Cover (> 60%); M = Moderate Canopy Cover (40 - 59%); P = Open Canopy Cover (25 – 39%); S = Sparse Canopy Cover (10 – 24%).

Vegetation Types: AGS = Annual Grassland; BAR = Barren; EPN = Eastside Pine; JPN = Jeffrey Pine; MCP = Montane Chaparral; MHC = Montane Hardwood-Conifer; MRI = Montane Riparian, PGS = Perennial Grassland; SMC = Sierra Mixed Conifer; WTM = Wet Meadow (Mayer and Laudenslayer 1988).

Aquatic Environment

The Bootsole Analysis Area contains portions of 4 HUC 12 Level 6 subwatersheds, with approximately 6 miles of perennial, 34 miles of intermittent, and 130 miles of ephemeral streams for a total of 170 miles of streams according to the National Hydrography Dataset (NHD). The main drainages within the WAA are Antelope, Bootsole, Clarks, Thompson, and Parker Creeks. There are approximately 31 special aquatic features within the analysis area, including 7 man-made dam or pool features, 11 springs, 4 seeps, 1 fen, and 15 acres of wet meadow which include 8 hydrologic features. For a more in-depth analysis of watershed, stream, and soil conditions, see the Bootsole Project Hydrology and Soils Report.

Description of the Proposed Action

The project proposes treatments in conifer stands that would selectively remove conifers, using variable density silviculture prescriptions to promote a mixture of tree sizes and structural diversity throughout the project area. Residual stands would be more open, increasing the amount of available soil moisture and sunlight for individual trees. Prescriptions would generally retain old-growth and large trees while promoting shade-intolerant, fire-resistant conifers. Select conifers would be removed using a combination of ground-based mechanical thinning, hand thinning, hand piling, grapple piling, mastication and prescribed burning. Following conifer removal, prescribed burning could be used to reduce surface fuels throughout the project area.

Aspen and meadow treatments would remove encroaching conifers from the interior of meadows and aspen stands and thin conifers in the surrounding forest areas to minimize seed sources and prevent future conifer encroachment.

The project also proposes to improve system roads and obliterate unauthorized non-system roads that are negatively impacting watershed condition. Obliteration of roads that are not part of the National Forest Transportation System (non-system roads) would be completed using a combination of tracked mechanical equipment and manual labor with hand tools.

Project activities may occur beginning in Spring 2021. Proposed treatments are described below by treatment and vegetation type. Mechanical variable density thinning, mechanical fuels, hand thin, and prescribed burn only units are shown in Figure 4. The acreage of each treatment type is summarized in Table 3.

Table 3: Bootsole Project Acreage by Treatment Type

Silviculture Treatment	Acres	Explanation
Mechanical Thin	≤ 3,080[1]	General Forest Stands: Removal of conifers <30" DBH by variable density thinning. Follow up underburn and/or mechanical fuels treatment would take place in some units. Aspen and Meadows: Removal of conifers located in the interior of aspen stands/clones, meadows, and meadow buffers and within a 150' extended treatment zone (ETZ). Follow up underburn would take place in some units.
Mechanical Fuels Treatment	359	Hand thin or mechanically thin trees <11.0" DBH with machine piling or mastication of brush and activity created slash and specified existing down material. Follow up underburn or pile burn would take place in these units.
Hand Thin	331	Hand thin trees <6.0" DBH with hand piling or lop and scatter of activity created slash and specified existing down material.[1] Follow up pile burning or underburning would take place.
Prescribed Burn Only	463	Utilize low to moderate intensity prescribed fire to reduce surface accumulation of vegetative material. Areas may receive hand thinning pretreatments to meet burn plan goals. Existing roads and natural barriers would be utilized as fire lines to minimize new ground disturbance although additional improvements or fire line construction around the burn area perimeter may be necessary.
Total Treatment Acres	4,233	

Mechanical Thin

General Forest Stands

The project proposes to remove conifers less than 30 inches diameter at breast height (DBH) to promote resistance to disturbance (i.e. insects/disease, wildfire) and develop a more resilient stand that can better withstand current and predicted future conditions.

Conifer removal would be accomplished by individual tree selection utilizing Variable Density Thinning (VDT). Variable density thinning is a compilation of various thinning treatment elements; dense

[1] Where mechanical treatments are not possible due to site sensitivity or prohibitive access, units may be hand thinned and trees >6" DBH removed.

groups/clumps of trees, canopy openings (gaps) where few or no trees exist; and widely spaced trees within the matrix. This combination of activities would promote a mixture of tree sizes within a stand and across the landscape, restoring structural diversity while increasing fire resilience. A portion of smaller, healthy/vigorous trees would be left for diversity, structure, and to provide for the next generation of forest. Canopy cover and basal area would vary based upon stand type and stand potential.

In areas proposed for mechanical treatment, mechanical ground-based equipment would be used to harvest select trees greater than or equal to three inches DBH up to 30 inches DBH. Whole-tree yarding would be used when possible. Conifers ranging from 10.0 to 29.9 inches DBH would be removed and processed as sawlogs. Conifers ranging from 3.0 to 9.9 inches DBH would be removed as biomass chips where access for mechanical ground-based equipment and/or chip vans is not restricted. Existing downed wood would also be removed as biomass where levels are above desired condition. Where chip removal is not possible, biomass-size conifers may be treated on site through various mechanisms including: mastication; hand thin (using chainsaws), pile and burn; lop and scatter; and mechanical pile and burn. Equipment would generally be restricted to slopes of 35 percent or less although equipment could work on short pitches of slopes up to 45 percent outside of Riparian Conservation Areas.

Follow-up treatment may occur in some units to achieve desired conditions and remove material less than 3” DBH using mastication, pile and burn, or lop and scatter. Underburning may occur throughout some general forest stands as a secondary treatment.

Aspen

The project proposes to remove conifers within aspen stands to improve stand condition and wildlife habitat. Conifers would be removed from within aspen stands and where aspen occurs as a minor component within other forest types. Treatment would entail the removal of conifers located in the interior of aspen stands/clones and within a 150-foot extended treatment zone (ETZ) from the outer most aspen stem. Trees greater than 30.0 inches DBH would be removed. Exceptions to conifer removal in these areas would be shade-intolerant, fire-resistant trees that exhibit old growth/legacy characteristics such as platy bark, flat top; indicating their co-existence with the aspen prior to fire exclusion policies; these trees would need to show characteristics that indicate they are not a threat to aspen including slower growth and reduced seed production to be retained. Mechanical removal would be used where possible with hand thinning occurring in areas where mechanical treatment is not feasible due to site sensitivity, slope steepness, or accessibility.

Species such as juniper, lodgepole pine and white fir would not be retained. Lodgepole pine is a prolific seed producer and produces viable seed at an early age thus giving it a competitive edge in establishment and succession without disturbance. Also, white fir generally produces more cones along or within openings than in adjacent closed stands and is considered shade tolerant. This shade tolerance allows white fir to become established in the understory of aspen and gradually replace aspen as the dominant tree.

Aspen groves would be underburned to promote desired herbaceous plants, aspen regeneration (suckering), and reduce residual conifer regeneration. If above treatments fail to stimulate aspen growth response in decadent, declining aspen stands, aspen stems may be cut to stimulate new growth response. Temporary fencing around aspen stands may be installed post-treatment if needed based on monitoring. The temporary fencing would be installed and maintained by the Forest Service and would remain in place until determined to be effective by the interdisciplinary team.

Meadows

Removal of conifers within and around meadows would be accomplished using the same conifer parameters as the aspen units. Mechanical removal would be used where possible with hand thinning occurring in areas where mechanical treatment is not feasible due to site sensitivity, accessibility, or slope steepness. Meadow extended treatment zones (ETZs) would occur from existing meadow edges and extend up to 100 feet into forested stands. Meadow boundary delineators may include vegetation and soil composition, topography, changes in landform, or changes in soil moisture. Conifers within meadow ETZs would be thinned, targeting lodgepole pine and white fir for removal of seed sources to maintain meadow habitats. Prescribed burning would be used in meadows to reduce conifer regeneration and promote herbaceous vegetation.

Thinning in aspen and meadows is not designed to meet objectives associated with fuels or stand densities, therefore the removal of trees greater than 30.0 inches DBH is permissible consistent with SNFPA ROD. (USDA 2004b, p.51).

Mechanical Fuels

Forest fuels less than 11 inches in diameter would be removed from 359 acres of the project area. This area includes stands that have desired spacing of overstory trees but abundant understory and ladder fuels. Thinned material would be chipped and removed as biomass where access for mechanical ground-based equipment and/or chip vans is not restricted. Where chip removal is not possible, biomass-size conifers may also be treated on site through various mechanisms including mastication; hand thin (using chainsaws), pile and burn; lop and scatter; and mechanical pile and burn.

Hand Thin

Hand thinning would be used to remove fuels less than 6 inches DBH from the 300-acre California Spotted Owl Protected Activity Center (PAC). California Spotted Owl PACs are designed to provide habitat for California Spotted Owls. Treatments are intended to help provide quality nesting and roosting habitat for current and/or future occupants, and to make the habitat more resilient to future disturbance. Fire-resistant trees would be promoted and shade-tolerant conifers would be prioritized for removal.

Stands would be hand thinned as needed to facilitate prescribed burning and to promote legacy[2] and critical habitat trees. Thinned materials would be piled for later burning. Areas around any critical habitat trees including nesting, roosting, and high-value legacy trees would be raked. Underburning would occur in these areas once the hand thinning and pile burning treatments have been completed.

Hand thinning may also occur in stands identified for mechanical thinning or mechanical fuels when mechanical treatments are not possible due to site sensitivity or prohibitive access.

Prescribed Fire

Within stands that do not meet conditions for thinning treatments, prescribed burning would be used to reduce heavy fuel loading of small diameter trees and promote dominant/co-dominant trees. This would result in creating a more resilient ecosystem less prone to catastrophic wildfire.

Approximately 3,770 acres of the project area would also be analyzed for reintroducing fire to the ecosystem through prescribed burning as a secondary treatment. Where it is not feasible or recommended to underburn, pile burning would be used to remove fuels. Prescribed burning in this project is planned

[2] Legacy trees display old-growth characteristics. For ponderosa and Jeffrey pine a legacy tree is defined as a tree that has the following characteristics: (1) platy, yellow bark on four panels (on at least ½ to ¾ of the bole), (2) downward or outward sweeping branches on at least the top 1/3 of the tree, and (3) a rounding or flat top, regardless of age or diameter.

with an efficient economy-of-scale approach. Incidental hand thinning with chainsaws may occur as needed to facilitate prescribed burning.

Transportation Management

Road Reconstruction and Maintenance

The project proposes to repair, maintain, and/or reconstruct National Forest System roads that are contributing to watershed impacts. Action would be taken to improve road drainage, reduce erosion caused by concentrated road runoff, and reduce sedimentation from roads into the stream network. Specific miles of roads and road segments will be identified during project planning. Road treatments would be prioritized in areas with insufficient drainage, issues with water crossings, and roads contributing direct sedimentation to waterways.

Reconstruction would involve the widening of curves, excavating and/or placing fill material to reshape the roadbed so that runoff is less concentrated. Road dips with rock armored outlets may be installed to better disperse runoff from road surfaces. Construction of armored overflow dips at certain culverts would ensure that if the culvert is plugged, stream diversion along the road would be minimal. Additional improvements may include out-sloping road segments, constructing low water crossings, installation of rip-rap aprons on fill slopes, and replacing culverts.

Road maintenance may consist of installation of road dips to better disperse runoff from road surfaces, brushing, blading the road surface, and improving drainage.

Road Obliteration

Approximately 8.5 miles of routes not added to the National Forest Transportation System (NFTS) within the project area are proposed for obliteration. Obliteration may involve recontouring, subsoiling, or abandonment. Abandonment is appropriate where the road has become completely overgrown with vegetation. Obliteration may also involve removing drainage structures, restoring vegetative cover, blocking access, or some combination of these treatments. Obliterating roads would promote vegetative recovery, decrease compaction, increase infiltration into the roadbed, increase soil stability, and reduce erosion.

General Environmental Consequences

Terrestrial Environment

Direct effects include immediate changes in habitat conditions, disturbance/ harassment to individuals, and direct mortality to individuals during project activities. Risk of direct disturbance, including mortality, to individual animals addressed in this report is mitigated by survey efforts for selected species, incorporation of LOPs where appropriate, and implementation of Forest standards and guidelines. If presently unknown wildlife are discovered prior to or during implementation, and the species identified warrants a LOP, protections would be implemented. Indirect effects include effects that occur later in time or beyond the treatment area of the project. Indirect effects also may include effects to a species prey base.

In all proposed treatment types, noise disturbance and the presence of people and equipment could cause temporary disruption and/or displacement of wildlife species using areas within and adjacent to treatment units. Effects are anticipated to be short in duration and affected species are expected to return to the area and resume normal activities once project activities have subsided. Disturbance to breeding activities of sensitive species would be minimized through the implementation of Limited

Operating Periods (LOPs) for project activities. The direct effects of implementing the Proposed Action would primarily consist of changes to habitat conditions.

Mechanical Thinning

Direct and indirect effects due to mechanical thinning are expected to have short-term negative effects on closed-canopy associated species due to a reduction in quantity and/or quality of habitat. Short term beneficial effects are expected for species that prefer moderately dense habitat, as this type of habitat would increase. Long-term effects are expected to be generally beneficial for green forest associated species, due to an increase in the resiliency of stands to insects, disease, and stand-replacing wildfire.

After mechanical thinning and fuel treatments dense canopy cover habitat in the mid- to late-seral habitat would increase by approximately 210 acres by removing small diameter conifers from 3D stands, and promoting 4 size class trees (11-24" dbh) (Table 4). These treatments would result in an increase in habitat quantity and/or quality for dense canopy cover associated species. This type of treatment should have beneficial effects for late seral associated species by promoting the growth of mid-seral stands into late-seral habitat and by increasing the resiliency of these stands. The long-term effect should be healthier trees, growing into the larger size class 5 and able to withstand periodic drought, insect outbreaks, and/or fires. Additionally, mechanical thinning would be conducted using variable density thinning (VDT) prescriptions, which promote vertical and horizontal heterogeneity that may be beneficial to wildlife.

Mechanical thinning would result in the removal of snags and disruption and removal of down woody material through normal operations. Snags and large woody debris are important habitat components for wildlife that depend on them for nesting, denning, and resting structures. Removal of snags and large woody debris may also negatively impact important prey species for Sensitive wildlife. Project design features and forest-wide standards and guidelines for retention of these features would partially mitigate effects. Standards and guidelines for the retention of large logs as described in the 2004 SNFPA FSEIS ROD are designed to meet the needs of wildlife (Table 5).

Mechanical thinning with biomass removal simplifies the complexity and structure of forested stands, which can have negative impacts on species which prefer complex habitat for denning and nesting. Removing the lower and mid-level vegetative layers affects stand structure by reducing vegetative layering, small snags, and the diversity of microclimates within a stand that some species depend on to control exposure to predators and changes in ambient temperature. Linear openings created by mechanical equipment used to remove timber and biomass, lead to more reduced canopy cover and contribute to potential fragmentation of dense canopy cover habitat.

Mechanical Fuels and Hand Thinning Treatment

Direct and indirect effects of mechanical thinning hand thinning and grapple piling under the Proposed Action are expected to have short-term negative effects to species that prefer early seral habitat or a complex understory in mid to late seral habitat due to habitat modification. Impacts are expected to be small in scale and intensity due to the limited number of acres these treatments would occur on.

Brush and small tree habitat, when too thick can prevent wildlife from utilizing it. Treating brush fields and thickets of small diameter trees in a mosaic pattern would create greater variation in age structure and successional stages which would add to the habitat diversity in the Wildlife Analysis Area, and increase the overall utility of early-seral habitat.

Thinning of ≤11" dbh conifers in mid to late seral forest habitat would generally result in little or often no impact on current canopy covers and has the most positive effect on removing hazardous fuels. Any losses in canopy cover incurred within this part of the understory would be regained in the overstory as

reduced competition for resources allows residual trees to grow faster. However, hand thinning could result in simplifying the understory as discussed above for mechanical thinning.

Underburning

Prescribed fire is generally considered beneficial to many wildlife species when conducted at low to moderate intensity. Underburning would aid in healthy forest growth after treatment. There could be limited impacts to wildlife in the short term, such as disturbance or mortality to individuals. However, species in the Sierra Nevada region have evolved with fire as a natural part of the ecosystem and are resilient to low intensity fire. Prescribed fires decrease future fire hazard by reducing the buildup of hazardous fuels and potentially reducing the long-term, negative effects of a high-intensity wildfire to species dependent on green forest habitat. Prescribed fire also regenerates forb and grassland communities which in turn provide forage for many wildlife species, and their prey.

Underburning may cause a loss in the availability of snags and large woody debris. Additional snags may be recruited through burning, which could also result in the addition of large woody debris post-burning. However, these habitat features would not be immediately available for use by many species as it would take time for snags to decay before they could be used to create cavities or become woody debris on the ground.

Short term effects on meadow vegetation from prescribed fire that is allowed to creep or back into meadows would be offset by the new flush of growth that follows fire. The loss of vegetation can reduce thatching and ground cover and promote new growth and increase species diversity.

Table 4. Predicted changes in California Wildlife Habitat Relationship (CWHR) type in all forested mid- to late seral classes as a result of mechanical thinning treatment in the Bootsole Project.

CWHR Size and Closure Class	Wildlife Analysis Area Current Conditions (acres)	Change (acres)	Result (acres)	Percent remaining
4M	2,971	-109	2,862	96%
4D	953	+221	1,174	123%
5M	840	0	840	100%
5D	475	0	475	100%
6*	0	0	0	100%
Total	5,239	0	5,351	102%

Table 5. Approximate number of down logs by average diameter at breast height (DBH) needed to meet 10-15 tons per acre on the Plumas National Forest (2004 Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement Record of Decision).

Average dbh (inches)	Number of down logs
12	24 to 30

Average dbh (inches)	Number of down logs
14	18 to 24
16	14 to 20
18	10 to 14
20	8 to 12
22	6 to 8
24	4 to 6
26	4 to 6
28	4 to 6
30	4 to 6
> 30	2 to 4

Meadow Improvement

Direct and indirect effects due to improving meadow systems are expected to be generally beneficial in terms of habitat modification.

Improving meadow habitat throughout the project area is expected to create more favorable conditions for species dependent on this habitat type for all, or a portion, of their life cycle. Healthy meadows contain a high diversity of plant species which create important microhabitats and food sources for wildlife, including insects and pollinators which benefit the entire ecosystem. Meadows are of particular importance for invertebrates, a key food source for many birds, amphibians, and reptiles. Hand thinning in meadows can mimic the removal of trees that fire used to provide and is expected to improve meadow function and condition. Removing conifers from meadow interiors and meadow edges allows more sunlight and nutrients to be available to herbaceous vegetation, and likely increases water availability as well. Removing encroaching conifers from meadow edges would restore the meadow to its full size potential and increase meadow/forest edge habitat important to some species.

Additionally, thinning conifers within a buffer around the meadow will reduce the conifer seed source and slow future encroachment. Of the trees that remain along the meadow edge, a reduction in competition will encourage growth of larger trees which is favorable for many species associated with meadow-forest edge habitat.

Road Treatments

These activities will have both negative and positive effects on the terrestrial environment. Maintenance activities would create noise and ground disturbance during all activities. Roads contribute to habitat fragmentation, spread of noxious weeds, noise pollution and littering via traffic and human presence, and wildlife mortality/injury. There would be a slight reduction in habitat and habitat connectivity through brush removal and road widening. Improved roads could also result in more public traffic. Positive effects of road improvement would be long-term reduction of erosion from road degradation. The removal of brush increases visibility along the road margin, possibly reducing wildlife mortality/injury. Further, improved road conditions ensure public passage remains on the roadbed rather than trying to find an alternative means around a degraded section of road.

Decommissioning roads promote vegetative recovery, improve habitat connectivity, and reduce human impact such as removal of snags and logs for fuelwood, noise pollution, and overall disturbance. In addition, the proposed non-system road removal will reduce road densities, which is beneficial to all wildlife species.

Aquatic Environment

Direct effects include immediate changes in habitat conditions, disturbance/harassment to individuals, and direct mortality to individuals during project activities. In general, direct and indirect effects to the aquatic environment from the Bootsole Project would be minimal as all BMPs, S&Gs, and project design features would be adhered to protect water quality. Riparian Conservation Areas (RCAs) will be managed consistent with the SNFPA ROD (USDA 2004) Riparian Conservation Objectives (RCOs) and associated standards and guidelines, unless the RCO analysis demonstrates a need for different buffer widths (addressed in the Bootsole Project Hydrology and Soils Report). All applicable Best Management Practices (BMPs), Standards and Guidelines (S&Gs), and project specific design criteria will be followed.

Within RCAs, proposed treatments include mechanical thinning, grapple piling, hand thinning, and underburning. Mechanical equipment will enter RCAs except within equipment exclusion zones as defined by the hydrologist and for protection of Sierra Nevada yellow-legged frog habitat.

Mechanical Thinning

Direct effects to aquatic species in perennial and intermittent streams such as injury or mortality from mechanical thinning and hand thinning treatments would be unlikely as no mechanical activities would occur within 82 feet of stream channels. However, harassment or disturbance of individuals due to thinning activity (e.g. noise disturbance and ground vibration) near habitat could directly affect the species.

Vegetation management in the uplands can potentially change the hydrologic regime in the area. Soil erosion could direct sedimentation into streams that could create short-term unsuitable water quality that could disrupt habitat use by aquatic species. This treatment may initially increase sediment runoff due to disturbed soil and removed vegetative cover, however, as the remaining trees increase growth and the soil becomes stabilized, reduced canopy cover would increase soil interception of precipitation and could therefore increase ground water recharge. This is a benefit to sensitive amphibians and cold water fisheries habitat because reduced runoff and increased ground water retention could provide cold water later into the summer and fall season. With the implementation of standards and guidelines, best management practices, and project design criteria, it is expected that there would be no disruption in flows and minimal short-term sedimentation into streams.

Mechanical Fuels and Hand Thinning Treatments

Hand thinning within 82 feet of perennial and intermittent streams, springs and in the meadows could cause direct effects to individuals and short-term direct disturbance to the habitat. Implementation of Standards and Guidelines, Best Management Practices, Limited Operating Periods, and project-specific design criteria would partially mitigate adverse effects to aquatic species present.

Underburning

There could be direct effects from prescribed fire that is allowed to creep or back into aquatic environments. There is a small potential for the modification of streamside vegetation and loss of duff layer due to prescribed fire in riparian areas. However, aquatic environments do not readily burn and therefore most of the vegetation is left intact. Impacts from prescribed fires are expected to be short lived. Fire intensity should be low enough to allow some retention of duff layer and riparian vegetation that would prevent soil erosion and expedite recovery. With the implementation of project design features and BMPs, the effects of prescribed burning would be negligible.

Underburning and thinning treatments proposed within RCAs would release existing conifers to grow into larger diameter trees and thus be retained for future wildlife habitat and natural recruitment of large

woody debris into stream channels. The indirect effects of sediment reaching stream courses will be minimized through implementation of BMPs, S&Gs, SOPs, and project design elements.

Meadow Improvement

Meadows play an important role in carbon sequestration and water filtering, and contribute to habitat diversity on the landscape. Healthy meadows store water that is released back into the streams in the fall as vegetation dies out or goes dormant for winter. Removal of encroaching conifers within the current meadow and historic meadow boundary is expected to have a beneficial effect on meadows, allow for the expansion of meadow and riparian vegetation, and preserve and potentially enhance meadow hydrologic function. Meadow improvement is expected to be beneficial to aquatic species.

Short term effects include initial increased sediment runoff and potential increase in release of carbon and other nutrients into aquatic features. The release of sediment into stream courses would be short-term and resolved when vegetation recovers. The amount of carbon and other nutrients released is expected to be nominal, with increased amounts at the point of release and then quickly dissipating downstream.

Road Treatments

These activities will have both negative and positive effects on the aquatic environment. Negative impacts are expected to be short term, associated with temporary road construction and initial increased sediment runoff following road repairs and road obliterations. Long term beneficial effects are expected due to improved drainage and reduced road density.

Roads contribute to sedimentation of streams and watersheds, reduce water quality, obstruct natural hydrology, hinder wildlife movement, and increase public impact to the landscape. Construction of new temporary roads to access treatment units would increase these effects, however once the temporary roads are no longer needed for the Bootsole Project, they would be decommissioned.

Non-system roads are not maintained and are subject to washouts and rutting that redirect water flow with their continued use. Decommissioning non-system roads reduces these negative impacts by returning the road bed to its natural state. Decommissioning roads would promote vegetative recovery, which could decrease compaction, increase infiltration into the roadbed, increase soil stability, and limit concentrated flow and surface erosion. Over time, these areas would produce less sediment and surface runoff to adjacent watercourses. The activities may generate more sediment in streams in the short term, but in the long term the removal or maintenance of these roads will result in less sedimentation and reduced public impacts.

All S&Gs and BMPs for road construction, maintenance, and obliteration will be followed to minimize impacts to aquatic environments.

Cumulative Effects

The existing condition reflects the landscape changes from all activities that have occurred in the past. The analysis of cumulative effects of the proposed action evaluates the impact on TES habitat from the existing condition within the aquatic and terrestrial wildlife analysis areas. See Appendix D for a table of present and future foreseeable projects which may contribute to the cumulative effects of the Bootsole Project.

Present or Reasonably Foreseeable Future Activities

Present and future projects implemented in the area are guided by the direction found in the Plumas LRMP and SNFPA (USDA 1988 and 2004). Future activities within the vicinity of the Bootsole project include, fuelwood gathering, Christmas tree cutting, recreation, and cattle grazing. Additional activities in this vicinity include the Cradle Valley Forest Health Project and the Moonlight Fire Restoration Project. These two projects are expected to have similar short term effects to suitable habitat, and similar long term benefits of healthier forest and riparian habitats.

Portions of three grazing allotments overlap with the Bootsole WAA: Antelope, Antelope Lake, and Clarks Creek allotments. Potential effects to the terrestrial environment include overgrazing and trampling of vegetation. Potential effects to the aquatic environment include reduction in riparian vegetation, bank instability, changes to channel morphology and impacts to water quality from increased sediment and feces. However, grazing S&Gs and grazing permits are designed to minimize the impacts by livestock and keep the integrity of the landscape and waterways intact.

The fuelwood gathering and Christmas tree cutting programs on the PNF are ongoing programs that have been in existence for years and are expected to continue. These programs allow the public to purchase a permit to remove firewood and Christmas trees (Sapling tree 1 - 6" dbh) from National Forest System lands. In 2017, approximately 815 personal and commercial woodcutting permits were issued for the BKRD allowing the removal of 3,020 cords of wood in the form of snags and down logs. Approximately 3,447 Christmas tree permits were sold on the BKRD for 2017. The Bootsole project area, as well as the wildlife analysis areas, is open to woodcutting and Christmas tree cutting but amounts are not quantifiable. This area is heavily used by the public and there is an ongoing problem of green trees being cut as well as snags. These activities are expected to continue, resulting in the cumulative loss of these habitat components across the landscape. Snag and log removal are most common along, or within a short distance from, open roads. Obliteration of roads under the proposed action would reduce the area accessible for woodcutting. The past and future effect of these actions has been and would be to remove habitat structure used by wildlife.

Most of the recreation use within the wildlife analysis area consists of hiking, mountain biking, ATV riding, hunting, pleasure driving, and wildlife watching. These uses are expected to continue. The true extent and effect of these activities on terrestrial and aquatic species is not known.

Affected Environment/Environmental Consequences for Sensitive Species

Western bumble bee (*Bombus occidentalis*)

Existing Condition

Population Status

Historically, the western bumble bee was one of the most broadly distributed bumble bee species in North America, distributed along the Pacific Coast from Alaska to California and westward to the Colorado Rocky Mountains (Thorp and Shepard 2005, Cameron et al. 2011, Koch et al. 2012). The western bumble bee currently occurs in California and all adjacent states, but is experiencing severe declines in distribution and abundance due to a variety of factors including diseases and loss of genetic diversity (Tommasi et al. 2004, Cameron et al. 2011, Koch et al. 2012). Although the general distribution trend is steeply downward, especially in the west coast states, some isolated populations in Oregon and the Rocky Mountains appear stable (Rao et al. 2011, Koch et al. 2012). The overall status of populations in the west is largely dependent

on geographic region: populations west of the Cascade and Sierra Nevada mountains are experiencing dire circumstances with steeply declining numbers, while those to the east of this dividing line are more secure with relatively unchanged population sizes. The reasons for these differences are not known.

The western bumble bee populations and their habitats are threatened by diverse factors, including but not limited to habitat loss and fragmentation, contaminants, parasites, and habitat alteration resulting from fire suppression. Other habitat alteration (e.g., agricultural and urban development) may fragment or reduce the availability of flowers that produce nectar and pollen bumble bees require, and habitat alteration also may decrease the number of abandoned rodent burrows that provide nest and hibernation sites for queens. Invasive species also are impacting the western bumble bee, as bumble bees introduced from Europe for commercial pollination apparently carried a microsporidian parasite, *Nosema bombi*, which has been introduced into and impacted native bumble bee populations (Cameron et al. 2011). Exposure to organophosphate, carbamate, pyrethroid and particularly neonicotinoid insecticides has recently been identified as a major contributor to the decline of many pollinating bees, including honey bees and bumble bees (Henry et al. 2012, Hopwood et al. 2012). Further, fire suppression in many systems has permitted native conifers to encroach upon meadows, which decreases foraging and nesting habitat.

Habitat Requirements

The western bumble bee is currently managed as a USDA Forest Service sensitive species in accordance with the proposed USFS Region 5 2013 update. Queens overwinter in the ground in abandoned rodent (i.e., mouse, chipmunk or vole) nests at depths from 6-18 inches and typically emerge about mid-March (Heinrich 1979). Foraging individuals are largely absent by the end of September, and those that emerge from unfertilized eggs become males, which do not forage and only serve the function of reproducing with newly emerged queens (Heinrich 1979). Bumble bees may continue to forage when temperatures are below freezing even in inclement weather (Heinrich 1979).

Western bumble bees have a short proboscis or tongue length relative to other co-occurring bumble bee species, which restricts nectar gathering to flowers with short corolla lengths and limits the variety of flower species it is able to exploit. Western bumble bees have been observed taking nectar from a variety of flowering plants, including: *Aster* spp., *Brassica* spp., *Centaurea* spp., *Cimicifuga arizonica, Corydalis caseana*, *Chrysothamnus* spp. (now *Ericameria*), *Cirsium* spp., *Cosmos* spp., *Dahlia* spp., *Delphinium nuttallianum*, *Erica carnea, Erythronium grandiflorum*, *Foeniculum* spp., *Gaultheria shallon*, *Geranium* spp., *Gladiolus* spp., *Grindelia* spp., *Haplopappus* spp., *Hedysarum alpinum*, *Hypochoeris* spp., *Ipomopsis aggregata*, *Lathyrus* spp., *Linaria vulgaris*, *Lotus* spp., *Lupinus monticola*, *Mentha* spp., *Medicago* spp., *Melilotus* spp., *Mertensia ciliata*, *Monardella* spp., *Nama* spp., *Origanum* spp., *Orthocarpus* spp., *Pedicularis capitata, P. kanei, P. langsdorfii, P. groenlandica, Penstemon procerus*, *Phacelia* spp., *Prunus* spp., *Raphanus* spp., *Rhododendron* spp., *Salix* spp., *Salvia* spp., *Solidago* spp., *Symphoricarpos* spp., *Tanacetum* spp., *Taraxacum* spp., *Trifolium dasyphyllum, Trichostema* spp., *Trifolium* spp. and *Zea* spp. (Evans et al. 2008).

Analysis Area Surveys

Surveys for the western bumble bee have not been conducted in the Bootsole Project area. However, at least 15 of the plant species listed above are known to occur within the Wildlife Analysis Area, therefore, presence is assumed.

Environmental Consequences – Western bumble bee

Although potential direct effects on the western bumble bee include mortality of individuals or entire nesting colonies, it is difficult to precisely quantify the risk of and occurrence of such events for this species. We therefore focused on three management questions regarding the western bumble bee while designing and evaluating potential environmental consequences of the Bootsole Project:

1. Do bumble bees have continuous access to flowering plants from spring through autumn?
2. Does adequate habitat for nesting and overwintering sites exist (undisturbed areas with logs and clumps of grass)?
3. Are floral resources and nesting habitat fragmented or isolated in distribution? (e.g., is nesting habitat in close proximity to foraging habitat?).

Mechanical Thinning

Flowering plant species (nectar sources) known to be used by the western bumble bee occur at various degrees throughout the analysis area, however they are limited under the low-light, dense canopy of much of the eastside pine and mixed conifer stands. Within the treatment units, overstocking of trees and high fuel loading prevents favorable growing conditions for flowers. Mechanical treatment activities associated with the Bootsole Project can potentially cause short-term direct negative effects to foraging habitat for bees by crushing flowering plants. Any direct disturbance to existing flowering plants would likely be ephemeral as flowering plants will regenerate post-project. Opening the forest canopy would allow more sunlight and moisture to reach the ground, allowing an increase in flowering plants and foraging opportunities for the western bumble bee.

Ground disturbing activities also may destroy suitable nesting and overwintering sites for the western bumble bee within treatment units. Throughout the project, both spatially and temporally, there would be habitat refugia for the western bumble bee via clumps of no treatment and RCA equipment exclusion zones. These areas would not be entered during project operations, and RCA equipment exclusion zones would receive minimal disturbance during the project. Therefore, we expect suitable nesting and overwintering sites to persist throughout the length of the project. Further, given the linear nature of RCAs, equipment exclusion zones within RCAs also serve as habitat corridors for the western bumble bee, providing habitat connectivity between and among foraging and nesting habitat. In addition, units are not all harvested at once, so ground disturbance is on a small area at any given time.

Fungicide will be applied to stumps within a day post tree removal to prevent the spread of Annosus root rot. Although it is an insecticide, it is believed that, with the method of application (i.e., treating each individual stump versus broadcast application) and the amount used, these compounds applied to stumps should not affect the western bumble bee.

Mechanical Fuels and Hand Thinning Treatments

Direct effects include disturbance to individuals due to equipment and project activities. Potential effects due to grapple piling would be similar to those for mechanical thinning (see above). Effects due to hand thinning are expected to be minimal. Hand thinning activities are unlikely to destroy underground nesting opportunities or have measureable effects on the availability of floral resources.

Underburning

Direct effects to individuals could occur due to high soil temperatures during underburning if prescribed burning takes place when over-wintering queens residing underground are present.

However, follow up underburning in treatment units will be generally beneficial to bumble bee habitat, as the new growth that follows an underburn could improve foraging habitat. Prescribed fire will be lit outside RCA boundaries and allowed to naturally back in if conditions allow.

Meadow Improvement

Direct and indirect effects of mechanical thinning in meadow buffer areas would be as described for mechanical thinning above. Hand thinning within the meadow may disturb individuals and cause trampling of habitat. These effects are expected be short term, within the duration of the activity, and plants are expected to return the same or following season depending on timing of treatments.

Removal of encroaching conifers within the meadow and removal of trees within the historic meadow boundary are expected to have a beneficial effect on bumble bee habitat. Conifers have the potential to dewater meadows and lower the water table allowing for accelerated encroachment of other conifers and upland shrubs, altering the habitat. Overall, there would be beneficial effects for the western bumble bee from conifer removal along meadow borders. Removing conifers allows more sunlight and nutrients to be available to flowering plants, increasing the number and vigor of flowers for foraging bees. The removal of conifers within the meadow buffer will help slow future conifer encroachment in the meadow. Removal of conifers will allow for the expansion of meadow and riparian vegetation and preserve and enhance meadow health and function. Overall, meadow improvement is expected to provide increased foraging habitat for bumble bees.

Road Treatments

Most road maintenance activities will have no effect on western bumble bees except brush removal. Brush removal involves removing vegetation along the margins of the road that are encroaching the roadway and reducing driver visibility. Removal of flowering plants along roadways could result in a reduction in foraging habitat, but this reduction is considered negligible. In addition, reducing flowering vegetation along the roadway could reduce vehicle caused mortality of bees.

Road decommissioning may temporarily disturb bees but rehabilitation activities will increase foraging habitat by seeding with native grasses and wildflowers.

Cumulative Effects

There are no known cumulative effects beyond those listed under General Environmental Consequences (see above). These uses are expected to continue. The true extent and effect of these activities on the western bumble bee is not known.

Determinations - Western Bumble bee

It is my determination that implementing the Bootsole Project may affect individuals but is not likely to result in a trend toward Federal listing or loss of viability for the western bumble bee.

Foothill Yellow-legged Frog (*Rana boylii*)

Existing Condition

Population Status

The foothill yellow-legged frog (FYLF) is currently a Region 5 Forest Service Sensitive species. In December 2019 the California Department of Fish and Wildlife (CDFW) listed the Feather River and

Northern Sierra clades as threatened under the California Endangered Species Act (CESA). The Bootsole Project is located within the Feather River clade. The PNF LRMP (USDA 1988) contains direction to maintain viability of State-listed species, including providing habitat sufficient to maintain existing populations.

Threats to the population include habitat fragmentation due to anthropomorphic activities such as dams and altered flow regimes, chytrid fungus (*Batrachochytrium dendrobatidis*), introduction of non-native trout and bullfrogs, pesticide exposure, and climate change. Impacts associated with dams and altered flow regimes are widespread and significant. Climate change is expected to result in increased frequency and severity of natural disturbance events such as wildfire, droughts, floods, and landslides which can lead to local extirpations. Additional threats that can contribute to habitat degradation and population declines include mining, livestock grazing, recreational activities, urban and agricultural land use and expansion, cannabis cultivation, timber harvest, and some biological surveys and habitat restoration activities.

Habitat Requirements

Detailed descriptions of habitat requirements can be found in PSW-GTR-248 (Hayes et al. 2016) *Foothill Yellow-legged Frog Conservation Assessment in California* and the report to the California Fish and Game Commission: *A Status Review of the Foothill Yellow-legged Frog* (CDFW 2019).

Perennial streams, intermittent streams with perennial pools, and ponds below 6,000 feet in elevation are considered suitable habitat for foothill yellow-legged frogs. These frogs prefer partial shade, shallow riffles, and cobble sized or greater substrate (Hayes and Jennings 1988, Morey and Papenfuss 1990). Occasionally, this species is also found in other riparian habitats, including moderately vegetated backwaters, isolated pools, (Hayes and Jennings 1988, pers. observation), and slow moving rivers with mud substrates (Fitch 1938).

Habitat characteristics associated with non-breeding adult FYLFs have not been fully evaluated. Overwintering behavior is completely unknown, but adults are commonly found in tributaries prior to being found in the main stem waterway. They are rarely seen more than a few meters away from water, but it remains unknown if they utilize upland areas during winter months (Kupferberg 1996). Habitat use of juvenile frogs is also largely unknown. Some evidence indicates that they potentially use smaller waterways such as springs or small tributary streams (Lind et al. 2011). Throughout the annual cycle, foothill yellow-legged frogs are rarely encountered far from permanent water. Telemetry studies in the North Fork of the Feather River (PG&E 2005), indicate that adult FYLF move from tributaries to the main stem of the river to breed and return to tributaries in the summer, post-breeding. During the winter, frogs have been observed in abandoned rodent burrows and under logs (Zeiner et al. 1988). Recently metamorphosed frogs show a strong tendency to migrate upstream (Twitty 1967). Overwintering of larvae probably does not take place (Zweifel 1955).

Analysis Area Surveys

Visual encounter surveys (VES) were conducted in the project area in 2015 and 2016 for all amphibian species. Surveys were conducted as described in A Standardized Protocol for Surveying Aquatic Amphibians (Fellers and Freel 1995). No FYLF were found during the surveys, and there are no known observations of FYLF within the analysis area. There are no other known observations of FYLF within the analysis area. The project is at the high end of the elevation range where FYLF are found.

Environmental consequences

Mechanical Thinning

Direct effects including the killing or injuring of individuals from harvest machinery and tree felling, could be possible. Harassment of individual frogs from thinning activity (e.g. noise disturbance and ground vibration) that occurs near occupied habitat could also directly affect the species.

Mechanical thinning is planned in portions of the RCA that overlaps suitable FYLF habitat. However, mechanical equipment would not be allowed within 82 feet of perennial or intermittent streams, therefore direct impacts would be unlikely. Vegetation management in the uplands can potentially change the hydrologic regime in the area. Soil erosion could direct sedimentation into streams that could create short-term unsuitable water quality that could disrupt habitat use by this species. With the implementation of standards and guidelines, BMPs, and project design elements, there would be minimal adverse direct and indirect effects to FYLF and potential habitat. It is anticipated that there would be no disruption in flows and minimal short-term sedimentation into streams.

Mechanical Fuels and Hand Thinning Treatments

Direct and indirect effects of grapple piling would be similar to those described above for mechanical thinning. Direct effects of hand thinning include the killing or injuring of individuals during thinning and pile burning activities. Harassment of individual frogs from thinning activity (e.g. noise disturbance) within or near habitat may also directly affect the species. Indirect effects include changes in the microclimate (reduced humidity, and increased air temperatures) due to thinning treatments.

Implementation of project design features and BMPs would significantly reduce impacts to water quality and the probability of any adverse effects on individual frogs. To prevent accidental crushing of frogs, chainsaw thinning would be restricted with a LOP to the summer season (April 15 – Oct 31) when frogs are in streams, and not in uplands. Material to be burned would be piled outside of the 82-foot buffer, to prevent frogs, which may hibernate in piles, from inadvertently being burned.

Underburning

Direct effects include the killing or injuring of individuals due to burning. Indirect effects include changes in the microclimate (reduced humidity, and increased air temperatures) due to loss of riparian vegetation, loss of sheltering habitat due to consumption of woody debris, and increased sedimentation to the stream channel due to increased overland flows from the proposed project.

Underburn only treatment units would overlap with approximately small portions of RCA within suitable FYLF habitat. In addition, all thinning units are also considered for post-treatment underburning, including some portions of the RCA within FYLF habitat to be treated with prescribed fire. Project design features and standard management requirements have been incorporated into the Bootsole Project to mitigate potential negative direct and indirect effects of prescribed burning.

Meadow Treatment

Direct effects include the killing or injuring of individuals during thinning and pile burning activities. Harassment of individual frogs from thinning activity (e.g. noise disturbance) within or near habitat may also directly affect the species. Indirect effects include increased sediment in streams that may impact downstream populations by increasing water temperature and turbidity thereby reducing the quality of the habitat. Effects due to meadow treatment would be generally beneficial to FYLF habitat as healthy meadows store water that is released back into the streams in the fall as vegetation dies out or goes dormant for winter.

Road Treatments

Direct effects include mortality due to crushing or drafting during road construction, removal, or maintenance activities. Indirect effects include changes to water quality due to sedimentation. Increased sediment release could impact downstream habitat and/or populations.

The use of water for dust abatement by drafting water from creeks particularly during the summer months may cause changes in the flow regimes and water quality, especially within deeper pools and off channel waterholes. Changes in flow regimes can result in changes in surface water elevations, exposing egg masses to air drying for short periods (early summer) to potentially longer periods of exposure later in the summer, resulting in loss of egg viability. There is also the potential for individual tadpoles, egg masses, or amphibians to be taken up by the "drafting" process, resulting in mortality of individuals. Implementation of project design features and BMPs would significantly reduce the probability of any adverse effects on frogs. Amphibian/fish protection devices such as suction strainer (2mm gauge or less) would be used during drafting operations to prevent entrainment of tadpoles, egg masses or amphibians.

Cumulative Effects

There are no known cumulative effects beyond those listed under General Environmental Consequences (see above). These uses are expected to continue. The true extent and effect of these activities on FYLF is not known.

Determinations - Foothill Yellow-Legged Frog

It is my determination that the Bootsole Project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability. My determination is based on the following:

- There are no known occurrences of FYLF within the project area, and FYLF were not detected during recent surveys in the WAA.
- Mechanical equipment will be excluded from suitable habitat.
- Prescribed fires will be lit outside suitable habitat and allowed to back into suitable habitat if conditions allow. Fire spread is expected to be patchy and intensity light due to the inherent moist nature of the habitat.
- Road activities will be short in duration, minimal footprint, and equipment will stay on the road bed.
- All S&Gs, BMPs, and other project designs will be followed to minimize any potential impact to FYLF and suitable habitat.

California Spotted Owl (*Strix occidentalis occidentalis*)

Existing Condition

Population Status

The California Spotted Owl is currently managed as a USDA Forest Service sensitive species. The US Fish and Wildlife Service received two petitions (on December 22, 2014 and August 19, 2015) to list the California spotted owl as endangered or threatened under the Endangered Species Act. On November 8, 2019 the USFWS issued a 12-month finding that listing was not warranted (84 FR 60371, USDI 2019).

Mark-recapture data from long-term demography studies in the Sierra Nevada have indicated California spotted owl populations have declined within all three study areas on National Forests: Sierra (31 percent), Lassen (44 percent), and Eldorado (50 percent), while appearing to be stable or increasing within the Sequoia-Kings Canyon National Park demography study area (Conner et al. 2016, Tempel et al. 2014). Differences in population trends between the national forests and the national parks could be related to forest management strategies including logging and fire suppression practices (Blakesley et al. 2005, Seamans and Gutiérrez 2007, Tempel et al. 2014).

A detailed species account including life history, population status and threats can be found in Pacific Southwest Research Station General Technical Report 254 (PSW-GTR-254) *The California Spotted Owl: Current State of Knowledge* (Gutiérrez et al. 2017). The most significant threats are identified as:

1. Continued effects of forest management on both public and private land.
2. Increasing trends in large-scale, stand-replacing fire.
3. Invasion of barred owls.
4. Potential climate change direct effects on owl populations or climate-driven vegetation type conversions and increased fire activity.
5. Increasing human population growth and development.

Two additional issues that have the potential to become significant threats are illegal rodenticide use and West Nile virus.

It is uncertain whether and to what degree population declines are a result of recent management practices that created a more homogeneous forest, a history of more extensive and intensive management practices in previous decades (e.g., selective logging of large trees and snag removal), or a change in a population that is currently higher than was supported under historical forest conditions.

Habitat Requirements

Detailed descriptions of habitat requirements and use can be found in PSW-GTR-254 (Gutiérrez et al. 2017), the Region 5 *Conservation Strategy for the California Spotted Owl in the Sierra Nevada* (R5-TP-043, USDA 2019), and 70 Federal Register 35607 of June 21, 2005 (USDI 2005).

In general, habitat is characterized by closed-canopy forest with complex structure, including multiple layers in the mid to upper canopies, and high canopy cover from large trees (Gutiérrez et al. 2017, North et al. 2017, Blakesley et al. 2005, Verner et al. 1992). High canopy cover (greater than 70 percent) and large trees are the most important factors for spotted owl nesting and roosting habitat (Bias and Gutierrez 1992, Moen and Gutierrez 1997, Blakesley et al. 2005, Tempel et al. 2014). Although canopy cover down to 40% is considered suitable for nesting and foraging, it is only marginally so, based on owl occurrence and productivity threshold at around 50% canopy cover. Territory occupancy is positively associated with canopy cover >70% and sharply declines where canopy cover is <40%. Recent research using GPS-marked owls on the Plumas National Forest indicated that owls selected for canopy cover >70%, used 50-70% canopy cover in proportion to availability, and selected against <50% canopy cover for both foraging and roosting (Blakey et al. 2019).

All research shows they use large, old trees and snags as structures for nest and roost sites, embedded in a forest stand that has complex structure (Blakesley et al. 2005, Gutiérrez et al. 1992, Verner et al. 1992). Average nest tree is 49 in dbh and 103 ft tall with an average nest height of 74 ft (Gutiérrez et al. 1992, Roberts et al. 2011).

California spotted owl habitat is currently managed through the establishment of Protected Activity Centers (PACs) and Home Range Core Areas (HRCAs). The total acres designated in a PAC and HRCA on the Plumas National Forest are approximately 1,000 acres, comprised of the 300-acre PAC and 700 acres

of the best available habitat around or adjacent to the PAC. Spotted owl PACs and HRCAs are established for activity centers based on criteria described in the SNFPA FEIS ROD (USDA 2004). Blakey et al (2019) found that while spotted owls selected for PACs while foraging and roosting based on availability on the landscape, PACs protected less than one quarter of foraging space use and fewer than half of observed roosts during the breeding season. Maintaining suitable habitat conditions outside of PACs in the HRCAs and general forest, as well as maintaining habitat connectivity across the landscape is likely an important component for spotted owl viability.

Approximately 9% (1,315 acres) of the Bootsole Project wildlife analysis area is considered suitable spotted owl nesting habitat. Based on stand exam data no suitable nesting habitat exists within the Bootsole Project Treatment Area. An additional 27% (3,924 acres) is considered suitable foraging habitat (Table 6).

Table 6. Acres of Suitable* California Spotted Owl Foraging and Nesting Habitat on National Forest System lands within Wildlife Analysis Area and Project Treatment Units

CWHR Type	Habitat Type	Treatment Units (acres)	WAA Pre-treatment (acres)	WAA Post-treatment (acres)	Habitat Treated (percent)
4M	Foraging	379	2,971	2,862	13%
4D	Foraging	91	953	1,174	9%
5M	Nesting	0	840	840	0%
5D	Nesting	0	475	475	0%
6	Nesting	0	0	0	0%
Grand Total		**470**	**5,239**	**5,351**	**9%**

*** Suitable habitat includes Eastside Pine, Jeffrey Pine, Montane Hardwood-Conifer, and Sierran Mixed Conifer.**

Analysis Area Surveys

The Bootsole project wildlife analysis area contains one spotted owl PAC and associated HRCA, which constitute approximately 7% (1,064 acres) of the 14,508 acre wildlife analysis area on NFS land (Table 7). Spotted owl surveys were conducted within the wildlife analysis area by the Institute for Bird Populations in 2020, and will occur again in 2021 in order to follow the two-year protocol standards (*Protocol for Surveying for Spotted Owls in Proposed Management Activity Areas and Habitat Conservation Areas*, 1991, revised 1993). No spotted owls were detected within the project area. There are no known nest sites within the PAC.

Table 7. California spotted owl Protected Activity Centers in the wildlife analysis area.

Site Number	Site Name	Years Surveyed	Most recent observation	Known years with nesting CSO
PLU0163	Wemple	1990, 2020	1990 Pair	none

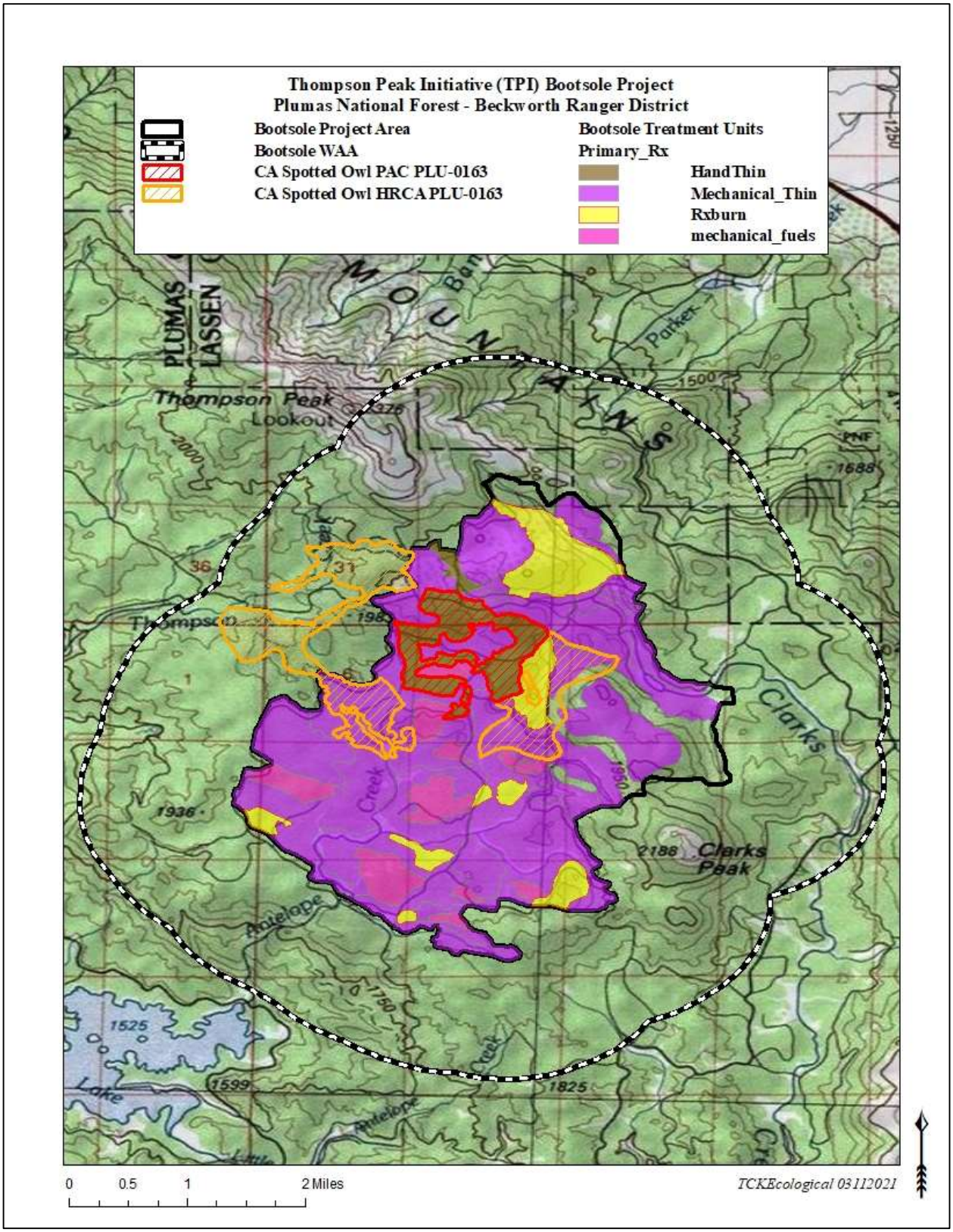

Figure 2: Spotted owl Protected Activity Centers and Home Range Core Ares within the Bootsole Project WAA.

Environmental Consequences – California Spotted Owl

Potential negative effects to spotted owls may result from the modification or loss of habitat or habitat components, disturbance to individuals, and rarely from direct mortality. Disturbance associated with logging, road maintenance, or other associated activities within or adjacent to occupied habitat may disrupt nesting, fledging, and foraging activities. The proposed action would not cut or remove nest trees. A Limited Operating Period (LOP) would be implemented from March 1 to August 15 within 0.25 mile of an active nest, or within 0.25 mile of the PAC if the nest site is unknown. No heavy equipment operations or tree felling would be allowed during the LOP. The LOP is expected to partially mitigate effects from increased human activity and equipment noise.

Within the Bootsole Project area, the proposed action would result in a reduction in quality of foraging and in some cases nesting habitat; dense canopy cover would be reduced within the units but would maintain the largest trees within treated stands and across the landscape. Treatments within the HRCA are located in eastside pine stand that do not currently meet HRCA desired conditions. Eastside pine stands do not have canopy cover restrictions, and exceptions are allowed within HRCA's where additional trees must be removed to adequately reduce ladder fuels. Site-specific prescriptions will be developed for stands within CSO HRCA to promote retention and development of spotted owl habitat while meeting project objectives. Prescriptions in HRCA will include one or more of the following measures as modification to the general forest prescription:

- Retain additional basal area of at least 20 square feet per acre
- Reduce the size of canopy gaps to a range of 0.1 to 0.25 acres to provide a more contiguous forest cover for spotted owl habitat
- Reduce the number of canopy gaps to one opening per 5 acres on average across the stand
- Retain all trees $\geq$ 24 inches dbh, except lodgepole No mechanical treatments will occur within PACs

The Proposed Action would have direct impacts to suitable habitat by removing trees and breaking up continuous canopy cover. While the treatments are designed to maintain suitable spotted owl habitat as currently defined, it would likely be reduced in quality. In the short-term, reducing the quality of habitat in the Bootsole Project area would have negative effects to spotted owl habitat and any spotted owls present. However, existing canopy cover would remain intact within spotted owl PACs, preserving habitat for nesting and roosting. Impacts of habitat modification within treatment units would be lessened by maintaining forest cover composed of the largest trees, while also providing structural attributes needed for prey species such as snags, large logs, and smaller trees and brush that contribute to understory complexity. Treatments are expected to provide long-term benefits to spotted owl habitat by increasing the resiliency of these stands and reducing the risk of habitat loss due to insects, disease, and wildfire.

Table 8. Acres of designated spotted owl habitat and planned treatment in the Bootsole Project.

Site Number	PAC Acres	HRCA Acres	Total PAC and HRCA Acres	PAC Acres in Units	HRCA Acres in Units	Percent PAC Treated	Percent HRCA Treated	Percent Total Treated
PLU0163	301	704	1005	301	354	100%	50%	65%
Total	**301**	**704**	**1005**	**301**	**354**	**100%**	**50%**	**65%**

Mechanical Thinning, Mechanical Fuels, and Hand Thinning Treatments

Mechanical thinning would occur on 470 acres (approximately 9%) of suitable spotted owl habitat in the analysis area primarily associated with plantations in the project area (Table 8). Mechanical thinning could result in short term adverse effects to spotted owls and suitable habitat. Past research conducted on the PNF has shown spotted owls avoid mechanically treated areas and such treatments resulted in increased home range size and decreased population size within four years of treatment (Stephens et al. 2014). However, this study did not implement variable density thinning which would provide more landscape complexity. Mechanical treatments that produce complex forest structure and composition closer to patterns generated under a more active fire regime may have less of a negative impact on spotted owl habitat than traditional thinning practices (North et al. 2009, Stephens et al. 2014). The Proposed Action would use variable density mechanical thinning, which would create lower density stands with larger average tree diameter that are more resilient to insects, disease, and wildfire, while enhancing heterogeneity that may be important to spotted owls and their prey.

Ninety-one acres (91) of CWHR 4D would be treated, and 80 acres would be reduced to unsuitable (4P). Seven (7) acres of this habitat is currently an overstocked pine plantation of even-aged trees, and as such is currently marginal foraging habitat. The other 73 acres are eastside pine with a dense understory of unhealthy, suppressed white fir. However, hand thinning of trees (0-6”dbh within the 301 acre SPOW PAC, that is currently classified as 3D based on stand exam data, will result in 4D stands that provide improved foraging habitat, and stand resilience that will lead to higher class stands in the future (5D and 6). Within the WAA the project will result in a net increase of 4D habitat from 953 acres to 1,174 acres. Mechanical thinning and fuels treatments within 379 acres of CWHR 4M stands would result in a reduction in canopy cover to 4P on 109 acres, with 270 acres reduced to the minimum tolerance but remain within the 4M classification. Overall canopy cover would be reduced, but the largest, tallest trees would be retained to grow into the large tree category for future nesting habitat. North et al (2017) found that the height of the canopy cover was a key factor, and that retention and promotion of large trees and the cover provided by large trees more directly benefit owl habitat than canopy cover from smaller trees.

No mechanical treatments would occur within any of the PACs. A Portion of the HRCA is within treatment units and suitable habitat would be directly affected by the Bootsole Project. Mechanical fuel treatments would occur on a total of 354 acres (50%) to be treated. Reducing density in these areas is expected to increase the resiliency and allow these stands to persist into the future; which will be beneficial to spotted owl habitat in the long-term.

In general, the best spotted owl habitat was designated in the PACs, whereas the HRCAs outside the PACs consist of the best available additional habitat and owl detection locations where possible. While treatments would reduce habitat quality within the HRCAs, because they are managed to retain more canopy cover than general forest, these areas would likely recover more quickly and provide more habitat value to owls than the areas outside the HRCAs, which is important for dispersing juveniles, for owls in winter when they may need to travel farther to forage, and for connectivity with adjacent PACs. Outside of HRCAs proposed treatments would open up the forest within suitable habitat but would not isolate stands from surrounding forest or create habitat islands isolated by non-forest, thus maintaining habitat connectivity.

The long-term effects of the Proposed Action on suitable habitat could be beneficial to spotted owl habitat, as forested stands would be at a healthier stocking level post-project, as well as more resistant to insect, disease, and high severity wildfire, which would help to grow and maintain suitable spotted owl habitat on the landscape. Additionally, by opening up the canopy, it would allow for the growth of understory forbs and shrubs, creating more diverse foraging habitat for prey species. Spotted owl survival and reproductive rates have been found to be higher in territories that included a mosaic of vegetation types among late seral forest, presumably because of the greater diversity or abundance of prey within this mosaic (North 2012 and references therein). Thus, negative effects to spotted owls and their habitat

in the short term is expected to be outweighed by the long-term benefits of greater structural diversity of stands and reduced potential for stand-replacing die off from insect, disease, or high severity fire.

Lee and Irwin (2005) suggest that modest fuel reduction treatments in the Sierra Nevada would not be expected to reduce canopy cover sufficiently to have measurable effects on owl reproduction, but did find that lethal fire simulations produced a pronounced and lasting negative effect. Jones et al. (2016) found that high severity fire had a strong negative impact on spotted owls, demonstrated both by avoidance of high severity burned areas by foraging owls and by a drastic increase in site extirpation. Although spotted owls will use burned habitat, particularly for foraging, and although burned areas provide other biologically valuable habitat components, such as snags and logs, these areas are typically logged for residual timber value and rapidly lose habitat value for spotted owls due to loss of canopy cover, either from logging or from eventual decay and collapse of snags. Large green forest can take a century or more to develop sufficient habitat complexity for spotted owls. The main purpose of the Bootsole Project is to reduce the overstocking of stands, which contribute to forest health issues and hazardous fuel accumulations, and can impact wildlife habitat by contributing to die-off of trees from insect and disease outbreaks and/or severe wildfires.

Additional mastication may be used as a follow-up to initial treatments to meet project objectives. Mastication may be used to break apart woody material such as dead and downed fuels and small trees, and may be used in place of hand-thinning. Mechanical fuels treatments would result in a reduction of understory complexity within suitable habitat. However, treatments would be designed to maintain a mosaic of brush clumps to benefit wildlife.

Hand thinning would occur within the entire PAC (363 acres). Noise disturbance associated with human presence and chainsaw use may disrupt nesting, fledging, and foraging activities. Implementation of LOPs would partially ameliorate any potentially disturbing effects associated with project activities. No suitable habitat would be reduced to unsuitable; hand thinning usually does not result in changes to overstory canopy cover. Some of the natural complexity of stands may be lost due to hand thinning, however the short term impact is expected to be outweighed by the long-term benefits of greater structural diversity of stands and reduced potential for stand-replacing die off from insect, disease, or high severity fire.

Based on the Pesticide Fact Sheet prepared by Syracuse Environmental Research Associates, Inc. (2016), the application rate for either Sporax or Cellu-treat used by the Forest Service is considered non-toxic to vertebrate species. There are no known effects on California spotted owls from either Sporax or Cellu-treat applied to stumps.

Underburning

Disturbance due to smoke, and noise related to activities such as line construction adjacent to occupied habitat may disrupt nesting, fledging, and foraging activities. Implementation of seasonal LOPs around spotted owl activity centers would partially offset any potentially disturbing effects associated with underburning activities. In addition, no underburning would occur within the PACs.

Approximately 463 acres are proposed for underburning only. In addition, post project underburning could occur on all suitable habitats as follow-up to thinning treatments within the project area. Due to logistical constraints, it is likely that many units would not receive underburns following other treatments; however, there is the potential to burn these units if the opportunity arises. Recent research suggests that spotted owls are not adversely affected by low- to moderate-severity fire (Roberts et al. 2011, Lee et al. 2013). Prescribed burning would contribute to lower fire risk in both the short- and long-term, and may be beneficial in creating desirable habitat conditions for spotted owl prey species. Large trees, which are an important component of spotted owl habitat, would be protected during prescribed burning by clearing duff and vegetation from around their boles. The effect of prescribed burns on snag and log

availability is uncertain as fire would consume some logs and snags, but also recruit new snags and downed logs depending on conditions during burning operations.

Underburning is expected to have minimal to beneficial impacts to spotted owl habitat. The long-term benefits of treatments are expected to outweigh the short-term negative effects to individual spotted owls and spotted owl habitat. Increased fire-resiliency would protect habitat from potential stand replacing fire that could eliminate PACs from the landscape.

Meadow Treatments

Removal of conifers encroaching on the meadow system is not expected to impact the suitability of any spotted owl habitat. No nest trees will be removed.

The removal of conifers from meadows would promote healthy growth of meadow vegetation, and improve the current conditions of the meadow systems, which may be an important habitat type for prey species. Therefore, meadow treatments are expected to be beneficial to spotted owls.

See above for general effects of thinning and underburning activities.

Road Treatments

Road maintenance could cause short term disturbance within or adjacent to occupied habitat for nesting, fledging, and foraging activities. Actions to remove existing roads, including road obliterations and seeding with native vegetation, would have a positive effect on spotted owls by facilitating vegetation recovery and lessening fragmentation of the habitat. Reducing open road densities would have a positive effect, by reducing human activities that often cause disturbance and reduce habitat suitability for many species, including spotted owls.

Cumulative Effects

General cumulative effects specific to the project area are listed under General Environmental Consequences (see above). These uses are expected to continue.

Overall, present and reasonably foreseeable future projects on forested land would cumulatively maintain suitable habitat by limiting treatments in PACs, reducing fuels accumulations, increasing resilience while limiting canopy cover reduction, and retaining snags and logs where available in surrounding conifer forest. Since 2004, commercial thinning in suitable habitat on Forest Service lands has been conducted under current Forest Plan standards and guidelines that require retention of at least 40 percent canopy closure and 40 percent of the basal area in the largest trees outside of HRCAs, while higher retention occurs in HRCAs and PACs. Adherence to this management direction resulted in thinning treatments that temporarily reduced habitat quality by reducing canopy closure and snag recruitment and increasing fine scale fragmentation with temporary roads and landings, but generally maintained existing habitat, and increased the likelihood of long term resilience by reducing the risk of adverse effects to habitat from high severity wildfire, insect, and disease.

Climate change has the potential to negatively impact spotted owls and their habitat. While the exact effects are difficult to anticipate, some general effects may be described for the range and habitat types of many Sierran habitats (Safford 2006). Fires are expected to become more frequent and more intense (Cayan et al 2006; Battles et al 2006; Mallek et al 2013). Higher fire activity will adversely affect important habitat components such as large tree densities and canopy cover. Fires also increase snag and surface woody debris in the short term (5-20 years), but increased frequencies of fire ultimately reduce these important habitat components over the long term because large trees are not available to recruit new snags and logs over time. In addition, productivity of conifers in a warmer climate, particularly pines,

would be greatly reduced, slowing recovery of forest habitats. Fuels reduction projects have been shown to have measurable effects on wildfire behavior and spread (Safford et al 2009).

Metabolic impacts of warming climates on wildlife, their prey, and the vegetation that they utilize for habitat and forage are likely, but unknown, but may have profound effects as well (Safford 2006).

Determinations - California Spotted Owl

It is my determination that the Bootsole Project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for the California spotted owl. This determination is based on the following:

1. Suitable nesting habitat will remain unchanged within the wildlife analysis area with and there will be a net increase of 112 acres of suitable foraging habitat.
2. Important habitat attributes would be retained (large trees, snags, course woody debris).
3. Limited operating periods would reduce disturbance to nesting activity.
4. Improved forest resiliency would help maintain habitat on the landscape by reducing the risk of stand replacing events due to insect, disease, or high severity wildfire.
5. Improved timber stand conditions would create healthier stands that would mature into higher quality spotted owl habitat than is currently present in the project area.

It is acknowledged that implementation of the Proposed Action would involve some risk to habitat and subsequent uncertainty with regards to owl activity. Based on the amount of suitable habitat affected and the expected habitat condition post treatment the negative effects of the Proposed Action are expected to be outweighed by the long-term benefit of improved forest health and resiliency, which could help ensure the persistence of spotted owl habitat into the future.

Greater Sandhill Crane (*Grus canadensis tabida)*

Existing Condition

Population Status

Greater sandhill cranes are a state threatened, and a Forest Service sensitive species. Locally, greater sandhill cranes breed in northeastern portions of California and extreme western Nevada, and winter in the Central Valley of California where they are joined by other subspecies of Sandhill Crane (Grinnell and Miller 1944, Tacha et al. 1992, Littlefield et al. 1994, Small 1994, Floyd et al. 2007, Littlefield 2008).

Both breeding and wintering Greater Sandhill Cranes are considered locally rare to uncommon in appropriate habitats throughout California and western Nevada (Grinnell and Miller 1944, Garrett and Dunn 1981, Small 1994, Fix and Bezener 2000, Floyd et al. 2007). The breeding population in California was censused at only 276 pairs in 1986. Winter status of breeding populations is confused by influx of the more common Lesser sandhill cranes from breeding populations in the Arctic, but the population of greater sandhill cranes was estimated at 5-7,000 individuals in the late 1980s (Pogson and Lindstedt 1991). Sandhill Crane populations in California and the western United States are reported to be increasing (Pogson and Lindstedt 1991, Tacha et al. 1992), but trends are based on winter populations that include Lesser Sandhill Cranes (Tacha et al. 1992).

Habitat Requirements

Greater sandhill cranes breed in open wetland habitats surrounded by shrubs or trees. They nest in marshes, bogs, wet meadows, prairies, burned-over aspen stands, and other moist habitats, preferring

those with standing water. Breeders gravitate toward the edges between wetland and upland habitats, while nonbreeders may prefer open, grassy sites. An omnivorous species, cranes feed on grasses, forbs, roots, tubers, seeds, grains, earthworms, and insects. Larger prey, such as mice, small birds, snakes, frogs, and crayfish are also taken (Eckert and Karalus 1981, Terres 1980).

There is one area identified as Wet Meadow (WTM) habitat in the project area associated with Antelope Creek in the southwest portion of the project area, associated with Antelope Creek in the southwest portion of the project area, and is approximately 8 acres. There are several dry grassland areas scattered throughout the project area.

Analysis Area Surveys

No formal surveys were conducted for sandhill cranes. Sandhill cranes have been observed within the wildlife analysis area, however there are no records of breeding in the Bootsole WAA.

Environmental Consequences – Greater Sandhill Crane

Direct and Indirect Effects of Improving Forest Health and Forest Resiliency

Direct and indirect effects due to mechanical treatment and prescribed burning for forest health and resiliency are not anticipated because the species is not expected to occur in forested areas, as it is generally found in meadows and other open habitats.

Direct and Indirect Effects of Improving Meadow Systems

Indicator Measure 3: Changes in vegetation and meadow characteristics.

Removing conifers within meadows, restoring historical meadow boundaries, and thinning a 50-foot buffer around meadows could negatively affect greater sandhill cranes directly and indirectly in the short term, but will positively affect the species in the long term.

Mechanical thinning in meadow buffer areas could potentially cause disturbance to individuals or disrupt breeding activities should cranes decide to breed in the project area. The potential for direct mortality due to mechanical thinning activities is negligible given the mobility of adults and the low probability of cranes being in forested stands where mechanical thinning would occur. Hand-thinning within the meadow may disturb individuals and disrupt breeding activities. These effects are expected be short term. Should nesting be discovered prior to project activities, appropriate measures would be taken to avoid impacts to breeding cranes.

Removal of encroaching conifers within the meadow and removal of trees within the historic meadow boundary are expected to have a beneficial effect on sandhill crane habitat. Conifers have the potential to dewater meadows and lower the water table allowing for accelerated encroachment of other conifers and upland shrubs, altering the habitat. Removal of conifers will allow for the expansion of meadow and riparian vegetation and preserve and enhance meadow health and function. Overall, the Proposed Action is expected to provide improved habitat for sandhill cranes.

Underburning is typically done in the fall when cranes have left the area and migrated to lower elevations. Prescribed fire will be lit outside the RCA boundary and allowed to naturally back into the meadow if conditions allow.

Overall, improving meadow systems would be beneficial to sandhill cranes.

Direct and Indirect Effects of Improving Water Quality by Reducing Transportation System Effects on Watershed Resources

Most road maintenance activities will have no effect on greater sandhill cranes. There is some potential for noise disturbance; however effects are anticipated to be of short duration.

Cumulative Effects

There are no known cumulative effects beyond those listed under General Environmental Consequences (see above). These uses are expected to continue. The true extent and effect of these activities on greater sandhill cranes is not known.

Determinations – Greater sandhill crane

It is my determination that implementing the Bootsole Project may affect individuals but is not likely to result in a trend toward Federal listing or loss of viability for the greater sandhill crane.

Northern Goshawk (*Accipiter gentilis*)

Existing Condition

Population Status

A total of 588 northern goshawk-breeding territories have been reported from Sierra Nevada National Forests. As of May 2020, the Plumas NF corporate GIS coverage included 186 goshawk PACs. These numbers represent goshawks that have been found as a result of both individual project inventories to standardized protocols, as well as nest locations found by other incidental methods (general stand searches, nests found by other employees in the course of their work).

The PNF LRMP EIS (USDA 1988) stated that the Plumas has the capacity for 100 goshawk pairs. The 1988 PNF LRMP calls for a network of 60 nesting territories to provide for the viability of the goshawk. It is uncertain as to whether this figure is accurate. The Forest began delineating goshawk territories prior to implementation of SNFPA, and currently establishes 200-acre PACs for all newly discovered goshawk breeding sites (USDA 2004). The current number of 186 PACs exceeds the minimum objectives by more than double, and the predicted capacity of 100 PACs. However, it should be noted that it is unknown how many of these PAC's are actually occupied by goshawks. Actual numbers of goshawks on the Plumas is unknown.

Population trends of northern goshawks in the Sierra Nevada are unknown, although numbers are suspected to be declining due to habitat reductions and loss of territories to timber harvest (Bloom et al. 1986 in SNFPA FEIS). Based on several studies (Bloom et al., 1986, Reynolds et al. 1994, Kennedy 1997, Squires and Reynolds 1997, Smallwood 1998, DeStefano 1998, all in SNFPA FEIS) there is concern that goshawk populations and reproduction may be declining in North America and California due to changes in the amount and distribution of habitat or reductions in habitat quality. Monitoring of nest sites on the Mt. Hough Ranger District of the PNF from 1998 to 2002 indicates that over 5 years nesting activity occurred at approximately 36% of monitored sites annually (Natural Resources Information System (NRIS) wildlife database accessed 2014). From 2004-2007, the mean number of offspring produced during 62 nesting attempts on the PNF ranged between 1.1-1.9 offspring/nest (Dunk et al. 2011). Considered as a whole, these data indicate that the goshawk population on the PNF appears relatively stable.

Habitat Requirements

Northern goshawks are currently being managed under the PNF LRMP guidelines as amended by the SNFPA FSEIS ROD (USDA 2004). Habitat requirements for this species can be found within the SNFPA FEIS and summarized below.

Northern goshawks require mature conifer and deciduous forest with large trees, snags, downed logs and dense canopy cover for nesting, and appear to prefer more open habitats for foraging (forests with moderately open overstory, open understory interspersed with meadows, brush patches, other natural or artificial openings and riparian areas). Mature coniferous, mixed, and deciduous forest habitats provide large trees for nesting, a closed canopy for protection and thermal cover, and open spaces allowing maneuverability below the canopy (Fowler 1988). Research indicates that goshawks typically select canopy covers greater than 60% for nesting (Hall 1984, Richter and Calls 1996, Keane 1997).

For purposes of this analysis, the following affected CWHR types provide suitable nesting habitat: Aspen, Douglas-fir, Eastside Pine, Jeffrey Pine, Lodgepole Pine, Montane Hardwood-Conifer, Montane Hardwood, Montane Riparian, Ponderosa Pine, Red Fir, Sierra Mixed Conifer, White Fir, (6, 5D, 5M, 4D, 4M). For purposes of this analysis, the following affected CWHR types provide suitable foraging habitat: Aspen, Douglas-fir, Eastside Pine, Jeffrey Pine, Lodgepole Pine, Montane Hardwood-Conifer, Montane Hardwood, Montane Riparian, Ponderosa Pine, Red Fir, Sierra Mixed Conifer, White Fir, (5P, 4P, 3D, 3M) (SNFPA FEIS Vol3, Chap.3, part 4.4 pg 116).

PACs are designated from aerial imagery and GIS evaluations of CWHR types, and are the result of designating the best available habitat around known and suspected nest stands in relationship to geographical features and stand continuity. PACs are delineated based on guidelines provided in the SNFPA FSEIS 2004 ROD. Where there is insufficient suitable habitat (6, 5D, 5M, 4D and 4M), to meet the 200-acre guideline for a PAC, the next best vegetation sizes and types are included.

Table 9. Acres of Suitable Northern Goshawk Foraging and Nesting Habitat on National Forest System Lands within Wildlife Analysis Area

CWHR Type	Habitat Type	Acres in Wildlife Analysis Area	Acres in Treatment Units	Acres EPN in Treatment Units	Habitat Treated
3M	Foraging	1,149	1,042	723	91%
3D	Foraging	1,027	930	165	91%
4P	Foraging	3,160	589	161	19%
5P	Foraging	290	0	0	0%
Total foraging habitat		**5,626**	**2,561**	**1.049**	**46%**
4M	Nesting	2,971	379	336	13%
4D	Nesting	953	91	80	10%
5M	Nesting	840	0	0	0%
5D	Nesting	475	0	0	0%
6	Nesting	0	0	0	0%
Total nesting habitat		**5,239**	**470**	**416**	**9%**
Total All		**10,865**	**3,031**	**1,465**	**28%**

Table 10. Northern goshawk Protected Activity Centers within the Bootsole Project wildlife analysis area.

Site Number	Site Name	Years Surveyed	Years occupied during survey period	Known years with nesting NOGO
R05F11AD01T48	Clarks Peak	1978, 1993, 2006, 2007, 2013, 2015, 2019, 2020	1978,1993, 2006, 2007, 2013	2006, 2007, 2013, 2015
R05F11AD01T56	Cradle Valley	1975, 2007, 2015, 2019, 2020	1975, 2007	2007

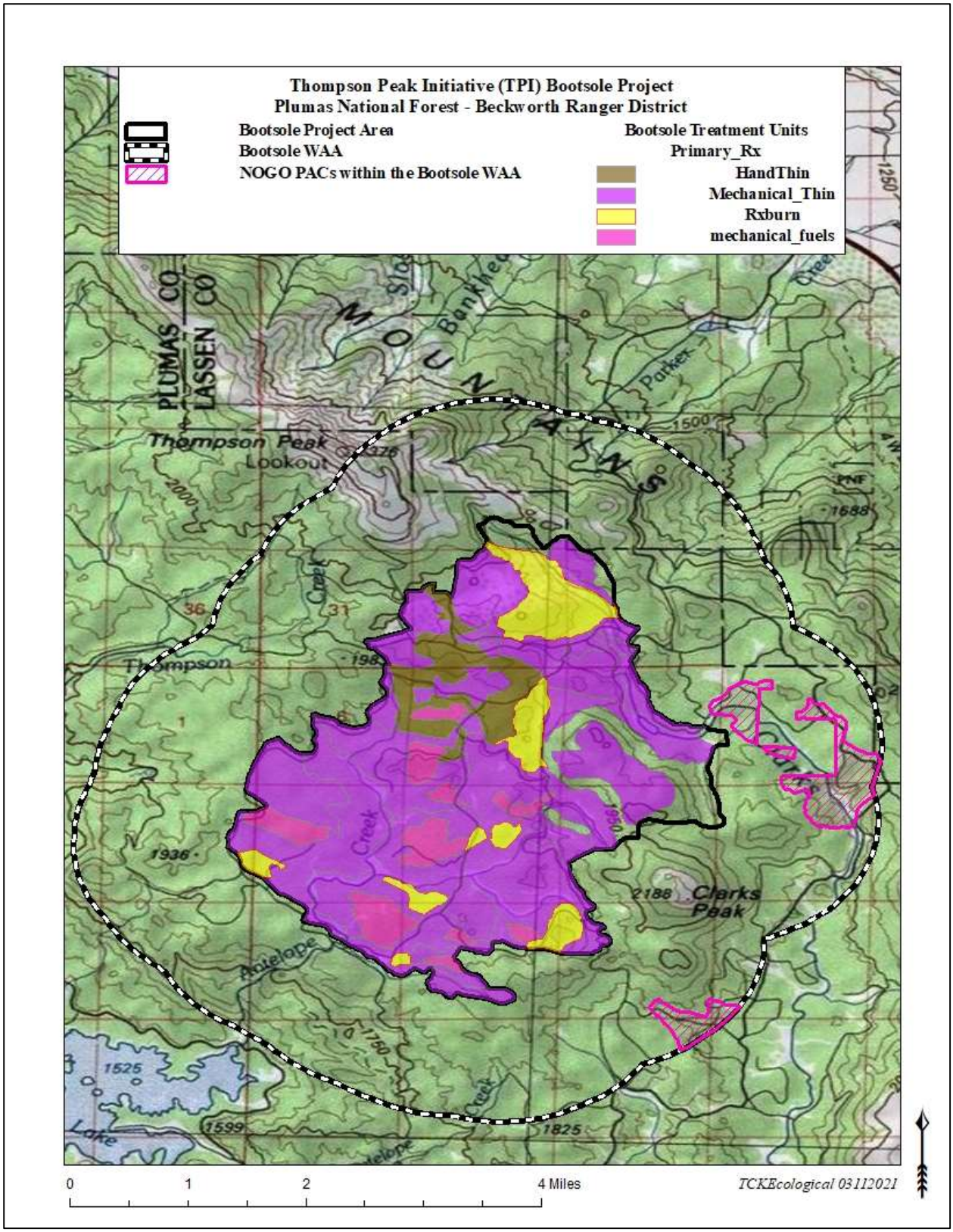

Figure 3: Northern Goshawk Protected Activity Centers in the Bootsole WAA.

Analysis Area Surveys

There are two northern goshawk protected activity centers (PACs) within the Bootsole project wildlife analysis area (Table 10). Northern goshawk surveys were conducted within the project area and wildlife analysis area in 2019 and 2020 by Institute for Bird Populations. Neither of the PAC's were occupied by nesting pairs.

Environmental Consequences – Northern Goshawk

The Bootsole Project proposes to treat 28% (3,031 acres) of suitable goshawk nesting habitat within the analysis area (Table 9). No treatment would occur within goshawk PACs. Within the Bootsole Project area, the proposed action will reduce 80 acres of 4D (suitable nesting habitat) to 4P (suitable foraging habitat) Dense canopy cover would be reduced within the units but would maintain the largest trees within treated stands and across the landscape.

Potential negative effects to goshawks may result from the modification or loss of habitat or habitat components, and rarely from direct mortality. No treatment would occur within northern goshawk protected activity centers (PACs). No removal of known nest trees would occur under the Proposed Action. Disturbance associated with logging, temporary road construction, or other associated activities within or adjacent to occupied habitat may disrupt nesting, fledging, and foraging activities (Richardson and Miller 1997). Limited Operating Periods (LOPs) would be implemented from February 15 to September 15 within 0.25 mile of an active nest, or within 0.25 mile of the PAC if the nest site is unknown. No heavy equipment operations or tree felling would be allowed during the LOP. Implementation of Limited Operating Periods (LOPs) around known goshawk nests, on treatment units, and access routes are expected to partially mitigate effects from increased human activity and equipment noise.

Mechanical Thinning, Fuel Treatments, and Hand Thinning

Based on the vegetation layer and the CWHR model, approximately 5,239 acres or 36% of the wildlife analysis area may be considered suitable goshawk nesting habitat (4M, 4D, 5M, 5D), and an additional 5,626 acres or 39% of the wildlife analysis area may be considered suitable goshawk foraging habitat (3M, 3D, 4P, 5P). Under the proposed action thinning and fuel treatments would occur on approximately 3,019 acres (28%) of suitable goshawk habitat within the wildlife analysis area (Table 9). Ninety-one acres (91) of CWHR 4D would be treated, and 80 acres would be reduced from suitable nesting habitat to suitable foraging habitat (4P). Seven (7) acres of this habitat is currently an overstocked pine plantation of even-aged trees, and as such is currently marginal nesting habitat. The other 73 acres are eastside pine with a dense understory of unhealthy, suppressed white fir. However, hand thinning of trees (0-6"dbh) within the 301 acre SPOW PAC, that is currently classified as 3D, will result in 4D stands that provide improved nesting/foraging habitat, and stand resilience that will lead to higher class stands in the future (5D and 6D). Within the WAA the project will result in a net increase of 4D habitat from 953 acres to 1,174 acres. Overall canopy cover would be reduced, but the largest, tallest trees would be retained.

Variable density thinning is designed to provide structural complexity through a mosaic of treated and untreated areas throughout each treatment unit, enhancing heterogeneity that may be important to goshawks and their prey. Bosakowski (1999) noted one study that recommended thinning with variable spacing to provide spatial heterogeneity characteristics of old-growth. In addition, goshawk productivity is closely associated with prey species abundance. Richer prey communities allow goshawks to exploit alternate prey species when preferred prey items are scarce (Salafsky, et al, 2007). An abundant and diverse prey base is reduced when forest composition and structure limits the prey species habitat or accessibility to prey by the goshawks. Thinning dense stands would enhance foraging habitat, through enhanced growth of understory shrubs and forbs allowing for a greater diversity of prey species.

The total amount of suitable habitat available would not be affected by project activities. Further protections within California spotted owl HRCAs would ensure retention of dense canopy forest habitat (at least 50%) that would allow opportunities for future dispersal, nesting and foraging within the analysis area. Proposed treatments would open up the forest habitat but does not isolate stands from surrounding forest or create habitat islands isolated by non-forest, thus keeping habitat connectivity and increasing the likelihood for successful dispersal of wildlife.

Based on the Pesticide Fact Sheet prepared by Syracuse Environmental Research Associates, Inc. (2016), the application rate for either Sporax or Cellu-treat used by the Forest Service is considered non-toxic to vertebrate species. There are no known effects on northern goshawks from either Sporax or Cellu-treat applied to stumps.

Mastication may be used as a follow-up to initial treatments to meet project objectives Mastication may be used to break apart woody material such as dead and downed fuels and small trees, and may be used in place of hand-thinning. Treatments would be designed to maintain a mosaic of brush clumps, which could be beneficial to goshawk prey species. Hand thinning within suitable goshawk habitat is expected to result in minimal loss of canopy cover.

Northern goshawks prefer high canopy cover with open understory. Hand thinning could be beneficial to goshawks through removal of small diameter trees creating more open understory conditions, while leaving the overstory unchanged. Noise disturbance associated with human presence and chainsaw use may disrupt nesting, fledging, and foraging activities. Implementation of LOPs would reduce any potentially disturbing effects associated with project activities.

Underburning

Post treatment underburning is proposed for the entire project are as follow-up to thinning treatments, including goshawk nesting and foraging habitat. Due to logistical constraints, it is likely that many units would not receive underburns following other treatments; however, there is the potential to burn these units if the opportunity arises.

Disturbance due to smoke, and noise related to activities such as line construction adjacent to occupied habitat may disrupt nesting, fledging, and foraging activities. Implementation of seasonal LOPs around activity centers would offset any potentially disturbing effects associated with underburning activities during the breeding season.

Meadow Treatments

Noise disturbance associated with logging activities, human presence and chainsaw use may disrupt nesting, fledging, and foraging activities. Implementation of LOPs would reduce any potentially disturbing effects associated with project activities.

Removal of conifers encroaching on meadows is not expected to impact the suitability of any goshawk habitat. There could be some impact to suitable goshawk habitat immediately adjacent to meadows due to thinning within the 50 foot buffer zone around the meadow. These treatments would impact a minimal amount of habitat. No nest trees will be removed. There are no known nest trees within 50 feet of a meadow. Healthy meadows provide a diverse habitat for many species, including goshawk prey species. Thus, foraging habitat for goshawks would be improved, as well as overall diversity in the wildlife analysis area.

Road Treatments

Actions to remove existing roads, including road obliterations and seeding with native vegetation, would have a positive effect on goshawks by facilitating vegetation recovery and lessening fragmentation

of the habitat. Reducing open road densities would have a positive effect, reducing disturbance and human activities that often reduce habitat suitability for many species, including goshawks.

Cumulative Effects

There are no known cumulative effects beyond those listed under General Environmental Consequences (see above). These uses are expected to continue. The true extent and effect of these activities on the northern goshawk is not known.

Overall past, present, and reasonably foreseeable future projects on forest land would cumulatively maintain suitable habitat by limiting treatments in PACs, reducing fuels accumulations, increasing resilience while limiting canopy cover reduction, and retaining snags and logs where available in surrounding conifer forest.

Additional cumulative effects due to climate change would be similar to those described for spotted owls (see above).

Determinations - Northern Goshawk

It is my determination that the Bootsole Project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for the northern goshawk. This determination is based on the following:

1. Treatments would result in a net increase of 112 acres of suitable nesting habitat.
2. Important habitat attributes would be retained (large trees, snags, course woody debris).
3. Limited operating periods would reduce disturbance to nesting activity.
4. Improved forest health would create stands that would mature into high quality goshawk habitat.

It is acknowledged that implementation of the Proposed Action involves some risk to habitat and subsequent uncertainty with regards to goshawk activity. Based on the amount of suitable habitat available in the analysis area and the expected habitat condition post treatment, the improved forest health and resiliency due to implementing the Proposed Action is expected to outweigh any negative short-term impacts to goshawks and their habitat.

Sierra Marten (*Martes caurina sierrae*)

Existing Condition

Population Status

The distribution of Sierra marten, a mature-forest specialist, has substantially changed since the early 1900's. Distribution appears to have decreased in the northern Sierra Nevada and southern Cascade region and populations appear to be discontinuous (North, 2012). Comparing the historical and contemporary locations centered on Plumas County indicate large gaps between detections that were not historically present. Zielinski et al (2005) points out that these gaps are largely areas composed of National Forests that have received more impacts from humans, including timber harvest, road building, and – until the mid-1950's – trapping.

Recent genetic work has determined that the American marten is composed of several subspecies. The subspecies present in the Plumas National Forest is the Sierra Marten (*Martes caurina sierrae*).

Habitat Requirements

Habitat requirements for forest carnivores can be found in California Wildlife Habitat Requirements (Zeiner et al. 1990), habitat capability models (Freel, 1991) and in Ruggerio et al. (1998).

In the Sierra Nevada, marten are most often found above 7,200 feet, but the species core elevation range is from 5,500 to 10,000 feet (USDA 2001). Martens prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy cover, and an interspersion of riparian areas and meadows, (USDA 2001). Martens generally avoid habitats that lack overhead cover; they select stands with 40% canopy cover for both resting and foraging and usually avoid stands with less than 30% canopy cover (Ibid). Habitats with complex vertical and horizontal structure are preferred and selected for by martens (North, 2012). Foraging areas are generally in close proximity to both dense riparian corridors (used as travel ways), forest meadow edges, and include an interspersion of small (<1 acre) openings with good ground cover used for foraging (Ibid). Snags and down logs are important habitat elements for forest carnivores and their prey, and mesocarnivores can use multiple snags as denning sites per season. Large (>15" dbh) snags and logs provide more habitats per piece and are retained in the environment for longer periods of time (Ruggiero et al. 1998).

Important forest types include mature mesic forests of aspen, Douglas-fir, eastside pine, Jeffrey pine, lodgepole pine, montane riparian, ponderosa pine, red fir, Sierran mixed conifer, subalpine conifer and white fir (USDA 2001). CWHR types 4M, 4D, 5M, 5D and 6 are identified as moderately to highly important for the marten. The red fir zone forms the core of marten occurrence in the Sierra Nevada. Habitat conditions for martens are found to be best in old-growth stands, particularly red fir and lodgepole pine in proximity to meadows or riparian areas (North, 2012). These CWHR types have the highest probability of providing stand structures associated with preferred denning, resting and foraging. Small openings and regenerating stands (including plantations) are used by marten as foraging habitat (Ibid). These openings are of optimum value when they occupy a small percent of the landscape and occur adjacent to mature forest stands (CWHR 4D, 5M, 5D, and 6). Small openings within a forested matrix may be more conducive to marten populations than large contiguous openings (Ibid).

Most of the foraging and denning habitat available for martens in the analysis area exists as size class 4 stands (67% of denning habitat and 77% of foraging habitat). There are 1,428 acres of denning and high-quality foraging habitat (4D, 5D) and an additional 3,811 acres of foraging habitat in the analysis area (Table 11).

Numerous and heavily traveled roads are not desirable in order to avoid habitat disruption and/or animal mortality. Roads may decrease prey and food availability for marten (Allen 1987) due to prey population decreases resulting from road kills and/or behavioral barriers to movement. Open roads and improperly closed roads adversely affect mesocarnivores by: Allowing access to areas and causing disturbance to these animals from human intrusion and removal of snags and downed logs through wood gathering activities; Increasing vehicle/animal encounters resulting in road-kill; and fragmenting the habitat and affecting the ability of animals to use otherwise suitable habitat on opposing sides of the road (Duncan Furbearer Interagency Workgroup 1989). There may be a threshold value for road density (miles of open road per square mile) above which the habitat cannot sustain certain wildlife species but studies specifically addressing these effects on marten or fisher have not yet been addressed (USDA 2001). Early habitat models (Freel 1991) indicated that to provide high habitat capability for marten, open road densities should be less than 1mile/square mile, while 1-2 miles/square mile provided moderate habitat capability; more than 2 miles was providing low-no habitat capability. Models indicate that open road densities should be less for pacific fisher. The current road densities are high for mesocarnivores; approximately 5.17 miles of road per square mile in the Project Area and 3.41 miles of road per square mile in the Wildlife Analysis Area.

Analysis Area Surveys

There are over 40 records of marten observations/detections on the PNF dating back to 1975. Most of the detections on the Beckwourth Ranger District have occurred in the Lakes Basin Recreation Area, +/- 50 miles south of the project area. There are no records of marten observations within the analysis area.

Environmental Consequences – Sierra marten

Potential negative effects to marten may result from the modification or loss of habitat or habitat components, and rarely from direct mortality. Disturbance associated with logging, road construction, or other associated activities within or adjacent to occupied habitat may disrupt denning and foraging activities. Since the number and locations of marten territories and denning sites are unknown, direct effects on the number of individual martens and/or territories cannot be quantified. There are no known denning sites within the project area. If den sites, or concentrations of observations that may indicate the presence of a den site, are found a Limited Operating Period (LOP) would be implemented as a 100-acre buffer around the site from May 1 to July 31. No heavy equipment operations or tree felling would be allowed during the LOP. The LOPs are expected to partially mitigate effects from increased human activity and equipment noise.

Table 11. Acres of Suitable Marten Habitat on National Forest System lands within wildlife analysis area and treatment units.

CWHR Types*	Habitat Type	Wildlife Analysis Area (acres*)	Habitat in Mechanical Thin Units (acres**)	Habitat in Other Treatment Units (acres**)	Habitat Treated (percent)	Change in Habitat Post-Treatment (acres / percent)
6		0	0	0	0%	0 / 0%
5D		475	0	0	0%	0 / 0%
4D		953	91	0	10%	+221** / 23%
Total Denning		**1,428**	**91**	**0**	**6%**	**+221 / 15%**
5M		840	0	0	0%	0/0%
4M		2,971	366	13	13%	-109/4%
Total Foraging		**3,811**	**366**	**13**	**10%**	**-109/3%**
Total		**5,239**	**457**	**13**	**9%**	**+112/2%**

*Only vegetation above 6,000ft was considered in this table.
**301 acres of 3D will become 4D following treatments resulting in a net increase in 4D habitat.

Mechanical Thinning

Mechanical thinning would occur in approximately 457 acres of Sierra marten suitable habitat. The Proposed Action would use variable density thinning (VDT), which would create lower density stands with larger average tree diameter that are more resilient to insect, disease, and wildfire. Eighty (80) acres of CWHR 4D denning habitat would be reduced to 4P. However, as discussed in the spotted owl and goshawk sections, this portion of the project area does not currently represent very good denning habitat. Moriarty et al. (2016) found that martens avoided stands with simplified structure. Overall canopy cover would be reduced, but the largest, tallest trees would be retained, leading in the future to more suitable habitat for martens through development of structural complexity and density (Table 11). Marten populations consistently decline, or become locally extirpated, in areas below a threshold of 65 -75% forest cover (Hargis et al. 1999). Mechanical thinning would occur on 379 acres of CWHR 4M habitat. Two hundred seventy (270) acres would retain 40% canopy cover and continue to provide 4M foraging habitat. One hundred nine (109) acres of Eastside pine would retain 30% canopy cover and transition to CWHR 4P.

Overall, the Bootsole project area provides poor quality denning and foraging habitat for martens. In the short term canopy cover would be reduced, but the largest, tallest trees would be retained, leading in the future to more suitable habitat for martens through development of structural complexity and density.

Many studies have shown that marten use large trees and snags as rest sites that are typically the largest available, often >35 inches DBH (North, 2012). The intent of the Proposed Action is to primarily remove trees less than 20" dbh, while retaining the largest trees. The largest snags per acre would also be maintained. Additionally, project design features would retain conifers possessing characteristics that are of value for wildlife such as large limbs extending into the openings and meadow, mistletoe brooms higher than 20' from the ground, multiple tops, bole sweep, broken tops, heart rot, snags, etc. that would decrease the risk of deleterious effects to old-forest related wildlife, like marten, in the long term (Dunk, 2005). However, hazard trees, of any diameter size, could be removed, and important structural habitat components would be lost. Based on the Pesticide Fact Sheet prepared by Syracuse Environmental Research Associates, Inc. (2016), the application rate for either Sporax or Cellu-treat used by the Forest Service is considered non-toxic to vertebrate species. There are no known effects on martens from either Sporax or Cellu-treat applied to stumps.

Mechanical Fuels and Hand Thinning Treatments

Disturbance due to noise and increased human presence during mechanical fuels and thinning activities may have a direct or indirect effect on individuals and may cause martens to avoid these areas during implementation or disrupt denning activity. If marten were to be detected prior to or during project work, appropriate LOPs would be implemented to protect potential denning.

Within suitable habitat mechanical fuels treatments would occur on 13 acres of CWHR 4M habitat (Table 11). Canopy cover will not be reduced, but these treatments would simplify the understory and possibly cause martens to avoid these acres. Fuel treatments in marten habitat are therefore expected to have a negative effect on habitat quality and use by martens, however the amount of habitat impacted would be minimal. Any large snags and downed logs would not be removed.

Underburning

Follow up underburning within treatment units would simplify the lower forest canopy by burning off residual slash, small down logs and stumps. This could have a direct negative effect on marten habitat use.

There are 463 acres of underburn-only treatment planned under the Proposed Action, however, underburns are also proposed as follow-up treatment for all other thinning units (3,770 acres). Martens need complex forests with complex structure on or near the ground and continuous cover; they prefer areas with 65 -75% forest cover. Underburning can have the effect of simplifying the understory, depending on the intensity and continuity of burning during implementation.

Prescribed fire in this instance would not enhance marten habitat as they do most of their foraging along the ground and need the cover to rest and protect them from predators. Martens use snags, down logs and stumps for resting (North, 2012), and down logs and stumps are typically lost during underburning activities. While underburning can result in the creation of new snags, it is uncertain how many snags would be created or how long it would take for the new snags to decay to the point of becoming suitable habitat components for marten. Marten rely on the presence of large downed logs in the winter to provide access to the subnivean environment, to utilize as rest sites, and access (Corn and Raphael 1992). If all the acres proposed for underburns are treated, it could impact an unknown number of territories on 3,770 acres, rendering them (in part or in total), unsuitable post-treatment. Burning would take place over 5 or more years, therefore suitable habitat would not be lost all at once. However, this is high elevation habitat with a short growing season and it could take more than five years to recruit

adequate cover for marten use. If habitat becomes unsuitable or degraded due to underburn activities, individual martens may expand their territories, causing more competition for resources with martens outside of the treatment area. Due to logistical constraints, it is likely that many units will not receive underburns following other treatments; however, there is the potential to burn these units if the opportunity arises.

Meadow Treatments

Meadow improvement could have short term direct negative impacts to marten habitat through the removal of large conifers, up to 30" dbh, that provide canopy cover and large structural components that could be used for denning or resting. Thinning conifers from meadow edges simplifies the forested stand, and as stated above, this could have a negative effect on marten use of habitat. However, marten have been found to prefer forested habitat in proximity to meadows, improvement of meadow conditions could be beneficial to marten and their prey. Koehler and Hornocker (1977) found a high occurrence of fruits, insects, and ground squirrels (*Citellus columbianus*) in the summer-fall diet, indicating that marten used open areas for foraging. Since there are only 106 acres of meadow enhancement proposed within the 14,484-acre wildlife analysis area, effects to marten habitat would be negligible.

Road Treatments

Road maintenance could negatively impact marten through noise and disturbance. Research has shown marten tend to avoid roads and open spaces (Robitaille and Aubry 2000). Early habitat models (Freel 1991) indicated that to provide high habitat capability for marten, open road densities should be less than 1mile/square mile, while 1-2 miles/square mile provided moderate habitat capability; more than 2 miles was providing low-no habitat capability. The current road density within the wildlife analysis area is approximately 3.41miles of open road per square mile. Actions to remove existing roads, including obliterations of non-system roads within suitable habitat and seeding with native vegetation, would have a positive effect on marten by facilitating vegetation recovery and lessening fragmentation of the habitat. Reducing 8.5 miles of non-system roads post-project would have a positive effect, reducing human activities that often reduce habitat suitability for many species, including martens.

Cumulative Effects

In addition to the cumulative effects listed under General Environment Consequences, Sierra martens face additional impacts from illegal marijuana cultivation on national forest lands. Cultivation sites are often contaminated with anticoagulant rodenticides in order to discourage rodents that might chew on young plants. Anticoagulant rodenticides can cause both direct mortality and indirect mortality by making mesocarnivores lethargic (and thus prone to predation or starvation) and reduce reproductive capacities (Gabriel et al. 2015, Thompson et al 2014). A study by Gabriel et al. (2015) found that the death rate from toxicosis from rodenticide for the Pacific fisher rose from 5.6 percent during 2007-2011 to 18.7 percent from 2012-2014, tripling fisher deaths, and toxicant exposure rose from 79 to 85 percent. Craig Thompson, an ecologist with the USFS, has continued to test fisher carcasses gathered throughout California; in 2015 85% of fishers tested positive for rodenticides (out of 101 samples), and in 2017, all 22 carcasses tested positive for rodenticides (Banegas 2018). Four-hundred marijuana grow sites are found each year on national forest lands, but the actual number of sites is expected to be much higher as many sites are never located (Sullivan 2017).

As a species that inhabits high elevation habitat, marten are at considerable risk of negative impacts due to climate change. Reduced winter snowpack and changes in snow conditions can result not only in loss of habitat availability and connectivity for marten, but may also make habitat more available to other

species that are typically excluded from using areas of deep snow, including potential predators such as bobcats or competitors such as fisher.

Determinations– Sierra Marten

It is my determination that fully implementing all treatments, including reduced tree densities and underburning all units, may affect individuals, but will not contribute to a trend toward Federal listing of the species. This determination is based on the following:

1. There are no known occurrences of marten in the project area, and limited marginal denning habitat
2. The expected benefit of improved forest resilience.

Pallid Bat (*Antrozous pallidus*), Townsend's Big-eared Bat (*Corynorhinus townsendii*) and Fringed Myotis (*Myotis thysanodes*)

Existing Condition

Population Status

Three of the 17 bat species occurring on Plumas National Forest are designated as Forest Service sensitive species (*Antrozous pallidus, Corynorhinus townsendii, Myotis thysanodes*) and five are listed as species of special concern by the California Department of Fish and Wildlife (*A. pallidus, C. townsendii, Euderma maculatum, Lasiurus blossevillii, Eumops perotis californicus*. Townsend's big-eared bat (*Corynorhinus townsendii*) populations have declined over the last 40-60 years in California (USDA 2001). Pallid bats (*Antrozous pallidus*) are of conservation concern because of sensitivity to disturbance, and abandonment of roosting sites (Arroyo-Cabrales and Grammont 2008). Fringed myotis (*Myotis thysanodes*) is distributed across California except the central valley and in deserts (Mayer and Laudenslayer 1988), and may be locally abundant or rare throughout western North America from British Columbia south to Mexico (Keinath 2004). Population dynamics are not understood, but limited data suggests serious population declines with many historically occupied sites abandoned because of disturbance and habitat modification (CBWG 2016).

Habitat Requirements

Forest structure is an important determinant of insectivorous bat assemblages (Blakey et al 2017), as bats have diverse morphological and call adaptations for a range of forests from cluttered to open in structure (Schnitzler et al 2003; Blakey et al 2017, 2019b). For example, a large-bodied bat with narrow (high aspect ratio) wings and a long duration, low frequency call is well adapted to forage on fast prey in open spaces, but has difficulty maneuvering and detecting prey in cluttered habitat (Denzinger and Schnitzel 2013). In contrast, clutter-adapted bats can differentiate prey from surrounding vegetation using high frequency, wide bandwidth calls and maneuver well in small spaces with low aspect ratio wings.

All three sensitive bat species occurring on PNF exhibit morphological and call adaptation for cluttered environments (*Myotis thysanodes*: O'Farrell and Studier 1980, Schnitzler et al 2003; *Antrozous pallidus*: Frick et al 2009; *Corynorhinus townsendii*: Fellers and Pierson 2002, Seguura-Trujillo et al 2016). These three species exhibit a continuum of roost site requirements. *C. townsendii* is colonial and roosts in caves,

mines, and abandoned human structures, similarly *M. thysanodes* and *A. pallidus* roost in caves, crevices, and mines but these species also utilize live trees and snags for roosting.

Analysis Area Surveys

Blakey et al (2019b) sampled bats acoustically at 83 randomly selected sites (n = 249 recording nights) across the Plumas National Forest over three summers (2015-2017), investigating relationships between fire regime, physiographic variables and forest structure and probability of bat occupancy for nine frequently detected species (17 bat species detected on the forest in total, Blakey et al. 2019b). Results indicated relationships between bat traits were underpinned by adaptations to diverse forest structure. Bats with traits adapting them to foraging in open habitats, including emitting longer duration and narrow bandwidth calls, were associated with higher severity and more frequent fires, whereas bats with traits consistent with clutter tolerance (structurally complex vegetation) were negatively associated with fire frequency and burn severity; relationships between edge-adapted bat species and fire were variable on the forest and may be influenced by prey preference or habitat configuration at a landscape scale (Blakey et al 2019b). All three Forest Service sensitive species (*A. pallidus and C. townsendii, M. thysanodes*) employ a clutter-adapted foraging strategy (i.e., utilizing structurally complex vegetation, Blakey et al. 2019b). Clutter-adapted bats can differentiate prey from surrounding vegetation using high frequency, wide bandwidth calls and maneuver well in small spaces with low aspect ratio wings; however, some of these attributes (e.g., slow flight speed) may result in clutter-adapted bats being relatively more susceptible to predation in open habitats (Sleep and Brigham 2003).

Environmental Consequences – Bats

Proposed treatments would have short- and mid-term negative impacts (1-50 years post implementation) to sensitive bat species through reduction in complex forest vegetation structure, and project activities could disturb or cause abandonment of roost colonies if present. There are potential long-term benefits if proposed treatments should reduce the risk of future high severity wildfire passing through this landscape and potentially destroying all clutter-adapted sensitive habitats.

Mechanical Thinning and Mechanical Fuels, Hand Thinning, and Prescribed Fire Treatments

Direct effects are possible through the destruction of active roosts through removal of trees with hollows or loose bark, especially snags. The use of heavy equipment and chainsaws may cause noise and vibration disturbance significant enough to cause temporary or permanent abandonment of roost sites. These effects would be most severe during the breeding season (May 1 to August 15) when the potential exists for disturbance to active breeding females and maternity colonies. Proposed treatments would have short- and mid-term negative impacts (1-50 years post implementation) to sensitive bat species through reduction in complex forest vegetation structure, and potential long-term benefits if proposed treatments should reduce the risk of future high severity wildfire passing through this landscape and potentially destroying all clutter-adapted sensitive habitats. Proposed treatments also may result in clutter-adapted bats being relatively more susceptible to predation as it is reasonable to expect more open habitat will be created by proposed treatments (Sleep and Brigham 2003, Blakey et al 2019b). Aside from changes in habitat availability for clutter-adapted (sensitive) bats, prey availability also may be impacted by treatments and indirectly affect sensitive species foraging efficiency; however, the direction and level of potential impacts is unknown. Changes to foraging habitat via hand thinning are insignificant at the forest and species range scales. Managed fire may consume potential roost sites, but those same areas also would likely recruit potential roost sites through the prescribed burning process, so effects are expected to be negligible.

Meadow Treatments

The removal of larger trees >24”dbh within or near the edges of meadows has the potential to negatively impact roosting sites and some large snags may be felled as hazard trees during implementation near the edges of meadows. However enhancing meadow habitat improves diversity for many wildlife species, including insects. Healthy meadows provide an important breeding ground for invertebrates, a key food source for the three sensitive bat species, and improves water retention. Additionally, prescribed fire regenerates forb and grassland communities which in turn provide forage for insects. While the three sensitive species are clutter-adapted foragers, healthy insect populations can extend into nearby forests. Therefore, improving meadow habitat in the wildlife analysis area would improve foraging habitat for these species.

Road Treatments

There would be no significant negative direct or indirect impacts to bats through watershed improvements. Proposed work would indirectly have a positive impact on sensitive bat species by improving aquatic systems that support bat prey species.

Cumulative Effects

The existing condition reflects changes on the landscape from all activities that have occurred in the past, and analysis of cumulative effects of the proposed action evaluates the impact of the project on the existing condition within the analysis area. Cumulative effects to sensitive bat species could occur with the potential incremental loss of quantity and/or quality of habitat. Overall, increases in urbanization, increases in recreational use of NFS lands, and the utilization of natural resources on state, private and federal lands may contribute to habitat loss for these species.

White nose syndrome, a fungus that wakes hibernating bats resulting in high mortality rates, was recently recorded (June 2019) north of the Plumas National Forest near Chester, California. If white nose syndrome spreads in California, bat populations may experience sharp declines similar to the large die-offs reported on the eastern United States. Reducing disturbances to roosts and minimizing roost loss through harvest activities is an important consideration to prevent exacerbation of population declines and maintain healthy populations that can withstand additional stressors.

The fuelwood gathering and Christmas tree cutting programs on the PNF are ongoing programs that have been in existence for years and are expected to continue. Personal firewood cutting is a permitted ongoing activity in the analysis area along National Forest System Roads, and may negatively impact roost site availability and quality, given the majority of bat species on the Plumas National Forest use trees (alive and/or dead) for roosting. Road improvements associated with project activities may result in increased personal firewood collecting in the analysis area due to improved accessibility and snag visibility; however, data is not gathered on firewood collecting to permit such an evaluation. The risk of cumulative effects from the proposed activities will likely be negligible at this time based on the relatively small size of the project area in relation to habitat availability across the forest.

Determinations for All Bats

The Bootsole Forest Health Project may directly and indirectly impact individual sensitive bats (*Corynorhinus townsendii, Antrozous pallidus, Myotis thysanodes*) through implementation disturbance, reduced roost site availability and suitability, and will have short- and mid-term negative impacts (1-50 years post implementation) on sensitive bat foraging habitat; however, the project is not likely to result in a loss of viability in the analysis area, nor cause a trend toward federal listing.

This determination is based on the following:

1. Snags shall be retained at 2004 SNFPA FSEIS ROD standards and guidelines levels: 3- 6 snags, 15 inches and greater in diameter and 20 feet or more in height, should be left per acre.
2. Reducing forest stand density and improving overall health of the habitat and enhancing growth of the trees into the larger size classes important for future bat roosts.

Gray Wolf (Canis lupus)

Existing Condition

Population Status

The Lassen Pack is California's second contemporary pack, and the only currently known wolf pack in the state (CDFW 2021). The wolves generally utilize a broad area of western Lassen and northern Plumas counties, and the pack's home range is approximately 500+ mi^2. The pack has produced litters in 2017 (four pups), 2018 (five pups), 2019 (four pups), and 2020 (at least nine pups). The pack had two litters in 2020 – the original breeding female (LAS01F) had at least five pups, and a two-year old female (LAS09F) had at least four pups. Genetic analysis indicated the original male was a 2014 offspring of southwestern Oregon's Rogue Pack. While he sired the 2017-2019 litters, he has not been detected with the pack since spring 2019. A black-colored adult male began traveling with the pack as early as June 2019, and genetic analysis of pup scats showed the black wolf sired both 2020 litters. He is not related to other known California wolves, and his origin is currently unknown. The pack's original breeding female (LAS01F) is not related to known Oregon wolves and genetic analysis indicates she likely dispersed from some other part of the northern Rocky Mountain wolf population. In late summer 2020, a satellite-collared yearling male wolf (LAS13M) dispersed from the pack. After traveling through northern Lassen and Modoc counties, LAS13M entered Oregon in early October and remained there through early January 2021. At the end of 2020, the pack was thought to consist of at least five wolves. In September 2018, a yearling female from the pack was found dead, and the matter remains under investigation. According to the most recent CDFW update of gray wolf activity, the pack is utilizing portions of Plumas and Lassen County from west of Lake Davis north to west of Eagle Lake, over to Lake Almanor to the west. The western half of the Bootsole project currently overlaps the packs activity area.

Habitat Requirements

Wolves are habitat generalists and their primary resource requirements are adequate ungulate prey, availability of water, availability of den sites, ease of travel, snow conditions, availability of protected public lands, density of livestock, road density, human presence and topography (Mech et al. 1988, Paquet and Carbyn 2003). Wolves have large home ranges. They are well known to use and move long distances across a variety of habitat types including forests, deserts, tundra, woodlands, alpine areas, grasslands and agricultural areas (Mech 1995, Fuller et al. 2003). Territory sizes range from approximately 20 to 215 square miles, depending on available prey and seasonal prey movements (CDFW 2011). Wolf territories in the Northern Rocky Mountain Distinct Population Segment tend to be larger, however, and typically vary from 200-400 square miles (USDI 2011).

Analysis Area Surveys

No formal surveys were conducted for gray wolves. CDFW carefully monitors movements of the Lassen Pack and provides periodic updates on https://wildlife.ca.gov/Conservation/Mammals/Gray-Wolf . There are no known denning sites within the Bootsole WAA.

Environmental consequences

Common factors biologists consider when evaluating potential effects on wolves include: I) disturbance to dens and rendezvous sites, 2) loss of security habitat that can lead to greater human conflict and potential mortality, 3) impacts to prey species availability and distribution, and 4) livestock grazing (Kovacs et al 2016).

All Treatments

While wolves may be temporarily displaced during fuel reduction activities, it is difficult to attribute wolf movements and impacts to individual wolves or reproductive success to any specific activity and determine if an impact occurred. Because the scale of most fuel reduction activities is small relative to the normal range and movements of wolves, spatial displacement or disturbance from an activity is also expected to be within the normal behavior of wolves. Wolves may avoid or not be present in an area during management activities, but they may also avoid the area initially due to other ongoing uses and activities such as recreation, competition with other carnivores (mountain lions, bears), prey species distribution or other factors.

The activities of the project are not expected to decrease or increase security habitat for wolves to any significant degree. Wolves may move in response to human disturbance during the early denning period (early to mid May), but this has not been found to affect reproductive success or use of the sites in subsequent years (Frame et al. 2007). While wolves typically avoid areas with high human use, they do tolerate some level of human activity. Human presence may temporarily disturb or displace wolves from the area, but it would be difficult to attribute wolf movement, or impacts to individual wolves or reproductive success to this activity. There are currently no known wolf populations in the project area. However, if wolves were to occur within the project area, they could be disturbed by project activities such as noise above ambient levels associated with mechanical, hand thinning and road maintenance activities associated with increased traffic and human activity.

Disturbance concerns to wolves when implementing project activities, or their interrelated and interdependent actions, are associated with den and rendezvous sites and effects to reproductive success. A seasonal restriction will apply if an active gray wolf den site is detected in or near the project area during the project implementation. Exact locations, dates, and permissible activities will be determined in coordination with CDFW.With these project design features, the likelihood that reproductive wolves or pups would be adversely affected by project actions and any resulting environmental consequences is extremely unlikely.

Cumulative Effects

There are no known cumulative effects beyond those listed under General Environmental Consequences (see above). These uses are expected to continue. The true extent and effect of these activities on the wolf is not known.

Determinations – Gray Wolf

It is my determination that the Bootsole Project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability. My determination is based on the following:

- There are no known occurrences of gray wolves within the project area, or WAA
- Disturbance concerns to wolves when implementing range management activities, or their interrelated and interdependent actions, are primarily associated with den sites in late winter/early spring and effects to reproductive success and pups. With the planned coordination with CDFW, and the provisions for implementing seasonal restrictions around

den and rendezvous sites, the likelihood that wolves or pups would be exposed to project actions and their environmental consequences is extremely unlikely.

- Road density (maintenance levels 2-3) within the project area and WAA (5.17 mi./mile2; 3.41 mi./mile2) may be too high with existing use to support wolf use of the area (Thiel 1985, Mech et al 1988).

Summary of All Determinations

The Proposed Action of the Bootsole Project would protect, maintain or enhance key sensitive species habitat areas through project design, specifically: the use of variable density thinning, disturbance to owls and goshawks would be partially mitigated through implementation of Limited Operating Periods (LOPs), and riparian areas and meadows would be managed by designating RCAs and meeting BMPs during implementation. Nevertheless, impacts to NFS lands resulting from the Bootsole Project are expected to contribute to cumulative impacts on certain sensitive wildlife species. See Table 12 for a summary of the determinations.

The short term effects of the proposed action are anticipated to be outweighed by the long term benefit of maintaining and enhancing habitat on the landscape by improving overall forest health and resiliency. Project activities will result in restoration of important wildlife habitat by improving meadows throughout the area, reducing road density, and promoting the development of stands with larger diameter trees. Additionally, the use of prescribed fire would be beneficial to many wildlife species by promoting forage and prey species habitat.

Table 12. Determinations of Effects on Threatened, Endangered, Proposed, and Sensitive Animal Species that Potentially Occur on the Plumas National Forest

Species	Proposed Action
INVERTEBRATES	
Western Bumble Bee (*Bombus occidentalis)*	MAI
AMPHIBIANS	
Foothill yellow-legged frog (*Rana boylii*)	MAI
BIRDS	
California spotted owl (*Strix occidentalis occidentalis*)	MAI
Greater sandhill crane (*Grus canadensis tabida*)	MAI
Northern goshawk (*Accipiter gentilis*)	MAI
MAMMALS	
Sierra marten *(Martes caurina sierrae*)	MAI
Pallid bat (*Antrozous pallidus*)	MAI
Townsend's big-eared bat (*Corynorhinus townsendii*)	MAI
Fringe-tailed Myotis (*Myotis thysanodes)*	MAI
Gray wolf (*Canis lupus*)	MAI

*__Determinations:__ **T, E & P Species: WNA** = Will Not Affect, **MAINLA** = May Affect but Is Not Likely to Adversely Affect Individuals or their designated critical habitat, **MAILAA** = May Affect and Is Likely to Adversely Affect Individuals or their designated critical habitat.
FS Sensitive Species: WNA = Will Not Affect, **MAI** = May Affect Individuals, but is not likely to result in a trend toward Federal listing or loss of viability, **MAILRTFL** = May Affect Individuals, and is Likely to Result in a Trend toward Federal Listing or loss of viability.

These project level effects determinations are consistent with the determinations reached in the SNFPA 2004 ROD by meeting the following three conditions:

1. The project is designed in accordance with all Forest Plan design criteria as analyzed in the SNFPA FSEIS 2004 ROD, Table 2;
2. The spatial location and timing of this project, when considered cumulatively with all other projects affecting TES species and TES habitat, have been displayed and analyzed and results in a determination consistent with that reached in the SNFPA FSEIS 2004 ROD;
3. Available new information that was not available in the SNFPA FSEIS 2004 ROD has been included in this project level analysis and this new information leads to the same conclusion as that within the SNFPA FSEIS 2004 ROD.

Specific Design Elements or Mitigations

- Due to the presence of suitable SNYLF habitat, all hand thinning piles will be placed at least 82’ from perennial and intermittent stream channels, lake and pond shores and springs to avoid impacting the suitable habitat. No active ignitions for prescribed fire will occur within the 82’ buffer.
- **Wildlife Trees:** These trees shall be ≥20” dbh or greater and provide structure beneficial for wildlife use. Suitable trees can be identified by certain desirable characteristics such as teakettle branches, large diameter broken tops, and large cavities located within the tree’s bole.
- **Hardwoods:** Hardwoods will be favored for leave status and left standing. This includes species such as quaking aspen and cottonwood.
- **Large woody debris:** Large woody debris (LWD) shall be retained at 2004 SNFPA FSEIS ROD standards and guidelines levels, where available (10-15 tons/acre ≥12 inches diameter).

- In areas considered deficient in large woody debris, cull logs would be left at the stump, where possible.
- During grapple piling operations: Large woody debris should be left scattered across landscape.

- **Limited Operating Periods (LOPs):** project activities would have the appropriate LOP applied as identified in Table 13. Road maintenance activities and hauling of product may be permissible for routes through the area identified for wildlife protection during the LOP. Non-system roads and temporary road constriction would be subject to the LOP.

Table 13. Wildlife Limited Operating Periods for the Bootsole Project area. Operations would be limited during these periods over portions of the project area.

Species	Location	Limited Operating Period
California Spotted Owl	Within 0.25 mile of nests or within protected activity center boundary	March 1 - August 15
Northern Goshawk	Within 0.25 mile of nests or within protected activity center boundary	February 15 - Spetember 15
Sensitive bat species	W/in 0.25 mile of maternity roosts	May 1 - Aug 15
Yellow-legged frogs	Instream work	April 15 - October 15 Or dry soil conditions
Sierra Marten	100 acre den site buffer	May 1 to July 31
Peregrine falcon	Within 0.5 mile of nest site	February 1 - August 31
Gray wolf	TBD in coordination with CDFW	TBD in coordination with CDFW

*Unit numbers correspond to planning units (Appendix E). **Exact units may change with updated species location information.**

- **Snags/Dead Trees:** Snags shall be retained at 2004 SNFPA FSEIS ROD standards and guidelines levels: 3- 6 snags, 15 inches and greater in diameter and 20 feet or more in height, should be left per acre.
- **Structural Thinning:** Structural thin areas that are at the higher basal area range (clumps) may contain snags and leaning trees to favor wildlife. Lower basal area ranges (gaps) may contain “wolf” and “broom” trees.
- **Wildlife habitation and nest trees:** Trees that show signs of current habitation, including nesting activity shall be left standing and not removed, no matter the size.

Compliance with the Forest Plan and Other Direction

Areas of suitable habitat have been surveyed to protocols based on the best available science, to determine information relevant to implementation of site-specific resource management activities. This BE has documented the species surveys that were conducted for this project, as well as the protocols that were implemented.

Where appropriate, limited operating periods (LOPs) would be applied to unsurveyed habitat considered to be suitable for threatened, endangered, or sensitive species; and to habitat considered suitable for any species for which viability may be a concern. See pages A-54, A-60 – A-62 (SNFPA FSEIS 2004 ROD). This BE documents the need for LOPs as appropriate and needed. If target species are found,

LOPs would be implemented on a site-specific basis. As surveys are conducted, and no target species are found, LOPs can be lifted.

Habitat connectivity, including hydrologic connectivity, would be maintained to allow movement of old forest or aquatic/riparian-dependent species between areas of suitable habitat. The analysis considered habitat connectivity as required by the 2004 SNFPA ROD. The project would maintain habitat connectivity for aquatic/riparian-dependent species as discussed above.

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Appendix A

Forestwide Standards and Guidelines

The following list of standards and guidelines are a subset of applicable direction from the Plumas National Forest Land and Resource Management Plan (USDA 1988) and the Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement Record of Decision (USDA 2004).

Standards and Guidelines #11 – Determine retention levels of down woody material on an individual project basis. Within westside vegetation types, generally retain an average over the treatment unit of 10-15 tons of large down wood per acre. Within eastside vegetation types, generally retain an average of three large down logs per acre. Emphasize retention of wood that is in the earliest stages of decay. Consider the effects of follow-up prescribed fire in achieving desired retention levels of down wood.

Determine snag retention levels on an individual project basis. Design projects to sustain across a landscape a generally continuous supply of snags and live decadent trees suitable for cavity nesting wildlife. Retain some mid and large diameter live trees that are currently in decline, have substantial wood defect, or have desirable characteristics (teakettle branches, large diameter broken top, large cavities in the bole) to serve as future replacement snags and to provide nesting structure. When determining snag retention levels, consider land allocation, desired condition, landscape position, and site conditions, avoiding uniform distribution across large areas. During project-level planning, consider the following guidelines for large snag retention:

- In westside mixed conifer, white fir, and ponderosa pine types, four of the largest snags per acre.
- In red fir, six of the largest snags per acre.
- Use snags larger than 15 inches diameter at breast height (DBH) to meet this guideline. Snags should be clumped and distributed irregularly across the treatment units. While some snags will be lost due to hazard removal or use of prescribed fire, consider these potential losses during project planning to achieve desired snag retention levels.

Standard and Guideline #27 – Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species (particularly fisher and marten) in biological evaluations.

Standard and Guideline #28 – Assess the potential impact of projects on the connectivity of habitat for old forest associated species.

Standard and Guideline #29 – Consider retaining forested linkages (with canopy cover greater than 40%) that are interconnected via riparian areas and ridge top saddles during project-level analysis.

Standard and Guideline #32 – Detection of a wolverine or Sierra Nevada red fox will be validated by a forest carnivore specialist. When verified sightings occur, conduct an analysis to determine if activities within 5 miles of the detection have a potential to affect the species. If necessary, apply a limited operating period from January 1 to June 30 to avoid adverse impacts to potential breeding. Evaluate activities for a 2-year period for detections not associated with a den site.

Standard and Guideline #33 – Conduct surveys in compliance with the Pacific Southwest Region's survey protocols during the planning process when proposed vegetation treatments are likely to reduce habitat quality in suitable California spotted owl habitat with unknown occupancy. Designate California spotted owl protected activity centers (PACs) where appropriate based on survey results.

Standard and Guideline #34 – Conduct surveys in compliance with the Pacific Southwest Region's survey protocols during the planning process when vegetation treatments are likely to reduce habitat quality are proposed in suitable northern goshawk nesting habitat that is not within an existing California spotted owl or northern goshawk PAC. Suitable northern goshawk nesting habitat is defined based on the survey protocol.

Standard and Guideline #60 – For historically occupied willow flycatcher sites, assess willow flycatcher habitat suitability within the meadow. If habitat is degraded, develop restoration objectives and take appropriate actions to move the meadow toward desired conditions.

Standard and Guideline #75 – For California spotted owl PACs: Maintain a limited operating period (LOP), prohibiting vegetation treatments within approximately ¼ mile of the activity center during the breeding season (March 1 through August 31), unless surveys confirm that California spotted owls are not nesting. Prior to implementing activities within or adjacent to a California spotted owl PAC and the location of the nest site or activity center is uncertain, conduct surveys to establish or confirm the location of the nest or activity center.

Standard and Guideline #76 – For northern goshawk PACs: Maintain a limited operating period (LOP), prohibiting vegetation treatments within approximately ¼ mile of the nest site during the breeding season (February 15 through September 15) unless surveys confirm that northern goshawks are not nesting. If the nest stand within a protected activity center (PAC) is unknown, either apply the LOP to a ¼- mile area surrounding the PAC, or survey to determine the nest stand location.

Standard and Guideline #88 – Protect marten den site buffers from disturbance from vegetation treatments with a limited operating period (LOP) from May 1 through July 31 as long as habitat remains suitable or until another Regionally-approved management strategy is implemented. The LOP may be waived for individual projects of limited scope and duration, when a biological evaluation documents that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing, and specific location.

Standard and Guideline #92 – Evaluate new proposed management activities within Critical Aquatic Refuges (CARs) and Riparian Conservation Areas (RCAs) during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) at the project level and the Aquatic Management Strategy (AMS) goals for the landscape. Ensure that appropriate mitigation measures are enacted to 1) minimize the risk of activity-related sediment entering aquatic systems and 2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species.

Standard and Guideline #101 – Ensure that culverts or other stream crossing do not create barriers to upstream or downstream passage for aquatic-dependent species. Locate water drafting sites to avoid adverse effects to in-stream flows and depletion of pool habitat. Where possible, maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows, wetlands, and other special aquatic features.

Standard and Guideline #105 – At either the landscape or project-scale, determine if the age class, structural diversity, composition, and cover of riparian vegetation are within the range of natural variability for the vegetative community. If conditions are outside the range of natural variability, consider implementing mitigation and/or restoration actions that will result in an upward trend. Actions could include restoration of aspen or other riparian vegetation where conifer encroachment is identified as a problem.

Standard and Guideline #110 – Use screening devices for water drafting pumps. (Fire suppression activities are exempt during initial attack.) Use pumps with low entry velocity to minimize removal of aquatic species, including juvenile fish, amphibian egg masses, and tadpoles, from aquatic habitats.

Appendix B

California Wildlife Habitat Relationship (CWHR) Definitions

Table B-1. California Wildlife Habitat Relationship (CWHR) strata definitions

Tree Size		Canopy Closure	
Size Class	**Diameter at Breast Height (inches)**	**Closure Class**	**Percent Ground Cover**
1	<1	S	10-24%
2	1-6	P	25-39%
3	6-11	M	40-59%
4	11-24	D	60-100%
5	>24		
6	Size class 5 trees over a distinct layer of size class 4 or 3 trees, canopy exceeds 60%		

Table B-2. California Wildlife Habitat Relationship (CWHR) vegetation codes and their definitions

Habitat	Definition	Habitat	Definition
AGS	Annual Grassland	MHW	Montane Hardwood
BAR	Barren	MRI	Montane Riparian
DFR	Douglas Fir	PGS	Perennial Grassland
EPN	Eastside Pine	PPN	Ponderosa Pine
JPN	Jeffrey Pine	RFR	Red Fir
LAC	Lacustrine	SCN	Subalpine Conifer
LPN	Lodgepole Pine	SMC	Sierra Mixed Conifer
MCP	Montane Chaparral	WFR	White Fir
MHC	Montane Hardwood-Conifer	WTM	Wet Meadow

Appendix C

Wildlife Analysis Area Existing Vegetation and Acres Treated

National Forest System lands acres only

Table C - 1. Approximate CWHR Habitat Types within the Wildlife Analysis Area and Treatment Units.

CWHR	Existing Condition	Acres Treated
Meadows (AGS, PGS, WTM)	345	106
Brush (MCP, SGB)	636	0
BAR	208	0
Early Seral, Sparse Canopy (EPN 2S - D3S, 3P, SMC 3S, 3P; JPN3P-, SMC 2S-D, 3P)	1,702	1096
EPN3M, SMC 3M	1,149	1,042
EPN3D, SMC 3D	1,027	930
EPN4S, JPN 4S, SMC4P	710	0-
EPN4P, FPN4P, SMC 4P	3,160	589-
EPN4M, SMC4M	2,971	379-
EPN4D, MHC4D, SMC4D	953	91
EPN5P, SMC5P	290	0
EPN5M, SMC5M	840	0
EPN5D, SMC5D	475	0
Grand Total	**14,508***	**4,233***

*Calculated acres may not add up to the total indicated due to rounding

Appendix D

Cumulative Effects Analysis displaying present and future foreseeable projects on the Bootsole project area.

Table D-1. Present and future foreseeable projects within the Bootsole Project area and extended boundary. The extended boundary is the largest combined extent of all the cumulative effects analysis area.

Project Name	Year	Location	Treatment Type	Comments
Bootsole Project Area				
Present and Future-Foreseeable Projects				
Fuelwood Gathering	Ongoing	Forest-wide	There were 113 commercial woodcutting permits for 767 cords of wood and 727 personal woodwoodcutting permits for 2,132 cords of wood issued on the Beckworuth Ranger District In 2017.	Cord wood consists of dead trees and down logs within the forest, along forest roads, and within cull decks created by past logging operations, or as standing snags. Future annual quantities are estimated to be similar to those of 2017.
Christmas Tree Cutting Program	Annually, November - December	Forest-wide	There were 3,455 permits issued on the Beckwourth Ranger Distict in 2017.	This consists of the trees ≤ 6 inches in diameter (measured at the ground) permitted for removal. Future sales are expected to be similar to 2017.
Recreation	Ongoing	Forest-wide		Camping, bicycling, hunting, fishing, hiking, mining and OHV use.
Antelope, Antelope Lake, and Clarks Creek Grazing Allotments	Annually	Overlaps Bootsole Project Area	Cattle grazing.	Grazing throughout project area.
Extended Boundary				
Present and Future Foreseeable Projects				
Cradle Valley Forest Health Project	2017	West of Project Area 2,35	Conifer removal, road obliteration, streambank stabilization, native planting, and removal of in-stream structures.	Ongoing.
Moonlight Fire Area Restoration Project	2018	West and South of Project Area; 12,703 acres	Restoration of lands impacted by the Moonlight Fire (2007), including Mechanical thinning, Mechanical fuel Treatments, Hand Thinning, Aspen restoration, and prescribed buring.	Ongoing
Fuelwood Gathering	Ongoing	Forest-wide	There were 113 commercial woodcutting permits for 925 cords of wood and 702 personal woodwoodcutting permits for 2,095 cords of wood on the Beckwourth Ranger Distict in 2017.	No Hardwood Removal on Beckwourth Ranger District. Cord wood consists of dead trees and down logs within the forest, along forest roads, and within cull decks created by past logging operations, or as

				standing snags. Future annual quantities are estimated to be similar to those of 2017.
Christmas Tree Cutting Program	Ongoing	Forest-wide	There were 3,447 permits issued on the Beckwourth Ranger Distict in 2017.	This consists of the trees ≤ 6 inches in diameter (measured at the ground) being removed. Future sales are expected to be similar to 2017.
Recreation	Ongoing	Forest-wide		Camping, bicycling, hunting, fishing, hiking, mining and OHV use.

Appendix E

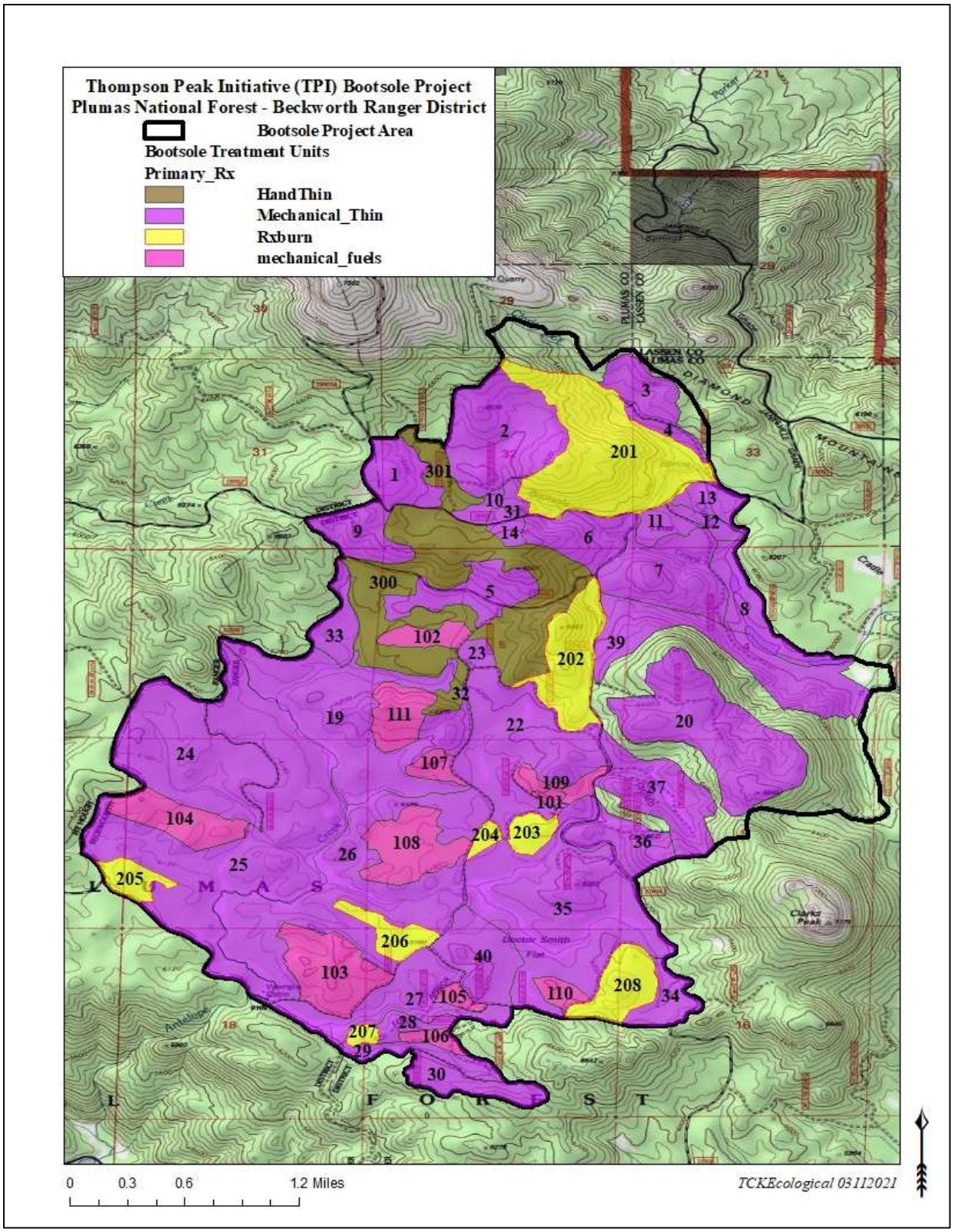

Figure 3: Bootsole Project planning units and numbers.